



THE GOUBERT

WATER TUBE FEED-WATER HEATER

THE GOUBERT MANUFACTURING CO.

85 LIBERTY ST.

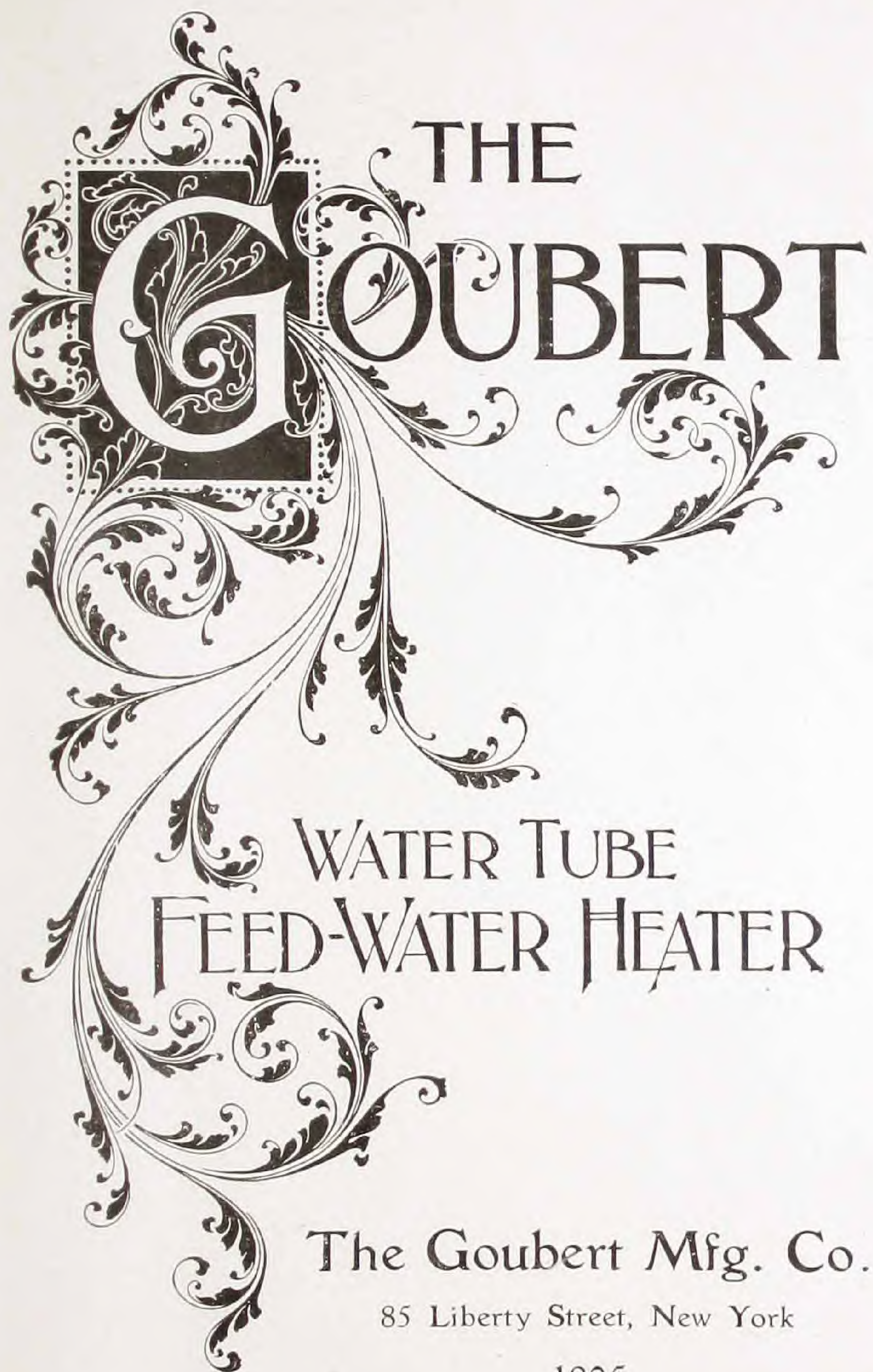
NEW YORK

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WATER TUBE
FEED-WATER HEATER

The Goubert Mfg. Co.

85 Liberty Street, New York

1905

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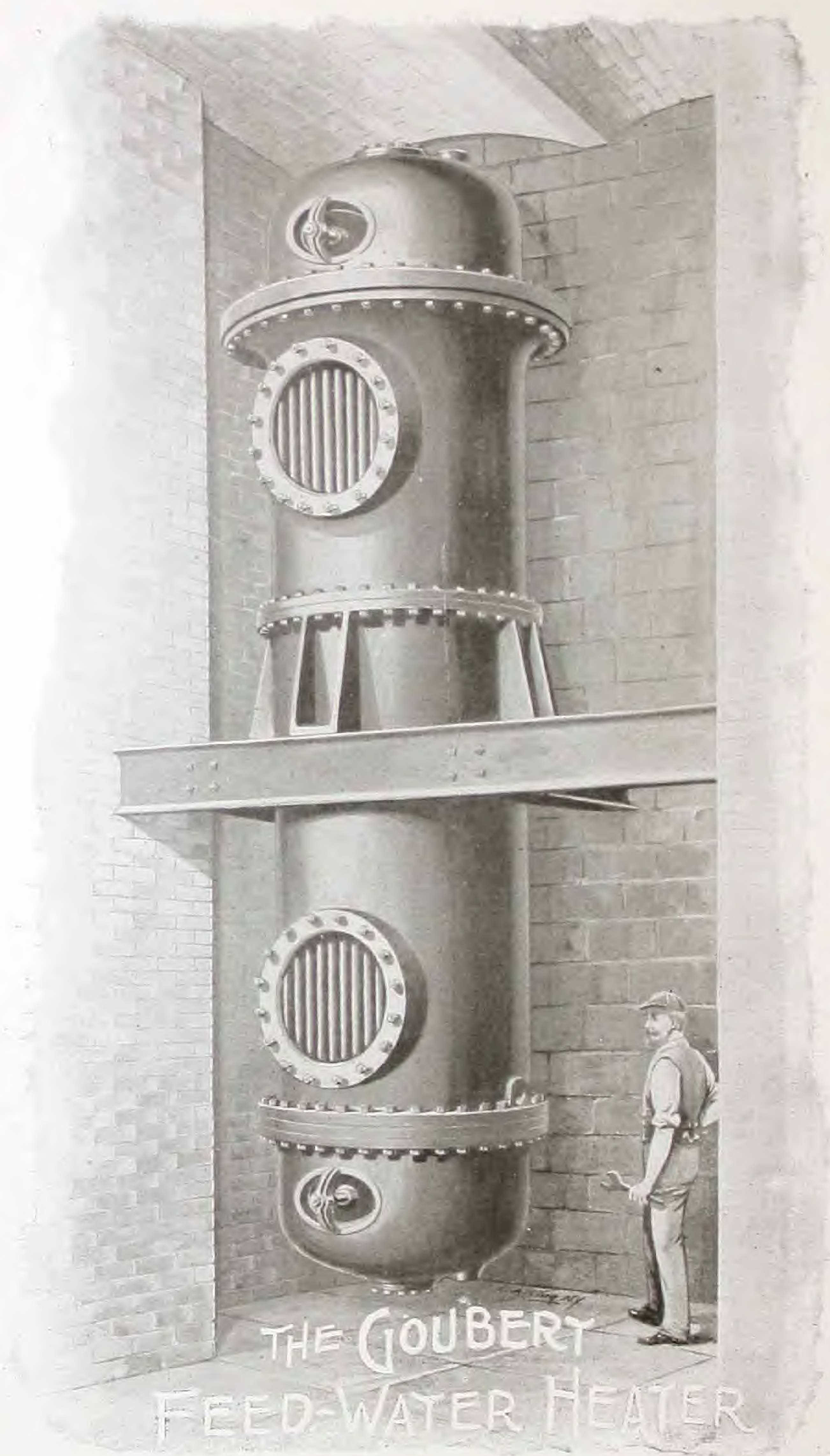
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WHAT IS A FEED-WATER HEATER?



MERELY an appliance used for heating water before it is fed to the boiler, and its advantage lies in the fact that the heat utilized for the purpose is derived from some source of waste.

Two such main sources of waste occur in every plant where steam is the medium through which the energy stored up in the fuel is transformed into mechanical work.



The first of these lies in the heat that escapes with the gases of combustion, whose temperature must necessarily be higher than that of the steam in the boiler.

To recover a portion of this heat a class of feed-water heaters, generally called economizers, has been devised. They consist of a series of pipes placed in a brick chamber forming an enlargement of the flue, between the boiler and the chimney. The water is fed through the interior of the pipes and abstracts heat from the waste gases, as the latter travel among these on their way to the chimney.

The temperature of these gases being comparatively high (although in a well-designed plant they should not leave the boiler at more than 450 degrees Fahr.) the belief generally prevails that the feed-water can be raised by their means to very nearly the temperature of the steam. That such a belief is erroneous can be readily shown:

In good practice, with twenty-two pounds of air supplied for combustion and nine pounds of water evaporated per pound of coal, about two and one-third pounds of waste gases pass off for each pound of water fed to the boiler, and as the specific heat of such gases is only about one-quarter that of water, therefore each degree that the water is heated will lower the temperature of the waste gases $4 \div 2.33 = 1.72$ degrees.

In the case mentioned above it would not be practicable to cool the gases more than 150 degrees and the water temperature would be raised $150 \div 1.72 = 87$ degrees; that is, presuming an average initial temperature of 50 degrees, that of the water

entering the boiler would be $50 + 87 = 137$ degrees, which exactly corresponds to results obtained in practice; a very fair result indeed, and although, according to Mr. Geo. H. Barrus, the cost of an economizer for, say, 1000 H. P. of boilers would be about \$8,000, the saving effect would represent a good dividend on the investment in cases where no other waste heat is available.



The other great source of waste we now have to consider lies in the heat that escapes from the engine with the exhaust steam.

According to the celebrated English engineer, Daniel Kinnear Clarke, the most economical multiple expansion engines transform into work only 18 per cent. of all the heat stored up in the steam leaving the boiler, and 82 per cent. goes to unavoidable waste. The majority of engines utilize but about 10 per cent. We have there a large store indeed from which to heat our feed-water, and that in a medium of such convenient form as to permit the use of the simplest apparatus.

There is in steam a certain amount of heat which the thermometer does not show and which is called latent heat.

When one pound of water heated to 212 degrees changes from the state of water into that of steam under atmospheric pressure, it has to absorb in order to effect this change 966 units of heat, while the temperature of the steam as shown by the thermometer is still 212 degrees, the same as that of the water. This is the hidden or latent heat.

If we bring cold water in contact with this steam, it will condense it—that is, it will restore it to the state of water—but before it can do so, the steam must part with that latent heat which will go to heat the cold water, and inasmuch that each unit of heat will raise the temperature of one pound of water one degree, one pound weight of steam would add one degree to 966 pounds of water, or it would raise six pounds of water from 50 degrees to 211 degrees.

Therefore, as the exhaust steam is about 80 per cent. of all that generated by the boiler, we only need to condense one-fifth to heat all the feed water, and as the limit of temperature to which we can heat the water is the temperature of the steam, we can come as close to 212 degrees as the construction of our apparatus will permit.

Many are the forms of apparatus that have been devised for heating the feed-water by means of the exhaust steam, but they may be divided into two distinct classes, viz. :

- 1 Open heaters.
- 2 Closed or pressure heaters.

OPEN ❧ ❧ HEATERS

THESE are of the simplest form and necessarily were the earliest types devised; they are cheap to construct and very effective.

The water is merely brought in direct contact with the steam into a vessel or tank, the main object being to subdivide the stream or retard the flow in order to cause a better absorption of the heat. At first the water was merely fed through a spray nozzle, but later, retarding plates or trays were introduced, causing the water to flow in thin sheets over an extended surface. Twenty-five years ago this type was in vogue; its best exponent, the "Waters" heater, had a large sale, but was short lived. The great drawback seemed to be that the oil and grease carried off by the exhaust steam became mixed with the water, and when fed into the boiler became decomposed under heat into oleic and stearic acids that soon destroyed the metal, while other portions united with sediment to form an exceedingly dangerous scale that often occasioned blisters in crown sheets and parts exposed to the fire to such an extent that the heaters were thrown out and cold water fed, with consequent loss of economy rather than incur the danger of explosion.

Filtering beds and skimming appliances were then tried, but the emulsion could neither be filtered nor skimmed off, and the type had to be abandoned.

It is not amiss to quote in this connection from the official organ of the Hartford Steam Boiler Inspection and Insurance Company:

[From "The Locomotive" for June, 1887, pages 89 and 90]

We have so often pointed out the evils and even dangers arising from the use of open heaters that it seems almost superfluous to refer to them again, and we would not do so were it not for the fact that they are still put in and used, and even adopted in some

cases against the advice of those who have tried them and experienced the usual kind and amount of trouble. **Where an open heater is used in connection with an engine, or in any place where the steam becomes contaminated by grease, especially animal oils or fats, trouble with the boiler is a dead sure thing.** We have never known of an exception to this rule. Various circumstances may delay the trouble for a greater or lesser time, but it is sure to come. The grease discharged into the boiler will settle down upon the fire-sheets, the sheets will become overheated and bulge or blister. If they are not of good quality there will be great danger of explosion. The only way to avoid the difficulty is to discontinue the use of such a heater, clean out the boiler, and begin again.

[From "The Locomotive" for February, 1882, page 26.]

We recommend a heater always, for we believe the working age of a boiler is increased by a good heater. But an open heater in carbonate of lime districts is almost sure to give trouble.

We have frequently warned manufacturers against using open heaters, especially where the water was heated by exhaust steam from the engine.

These difficulties have been remedied by substituting coil or tubular heaters.

[From "The Locomotive" for October, 1880, page 167.]

It is extremely difficult to separate fatty oil from hot feed-water after it has been thoroughly mingled with it by coming with the exhaust steam from the cylinder into the open or spray heater whence it finds its way into the boiler and with the solid matter forms a sticky deposit when the water is blown out, which adheres to the iron and is baked by the remaining heat into a hard greasy mass that effectually prevents afterwards the water from reaching the iron.

[From "The Locomotive" for December, 1882, page 191.]

Therefore, from a wide experience we advise that the exhaust be utilized to heat the feed-water, without bringing it in contact with it, which cannot be done unless a pipe or coil heater is used.

[From "The Locomotive" for March, 1884, pages 40 and 41.]

The question will be asked, What is the remedy for such difficulties?

The only safe remedy is (under the circumstances mentioned above) to use a closed heater, where the feed-water can be heated by the exhaust steam without coming in contact with the water in any way.

The opinion of parties whose business consists in insuring boilers against danger of explosion, who employ a corps of experts engaged in ascertaining causes of accidents that to

them mean a large pecuniary loss, is a valuable contribution, and the warning they sound cannot be disregarded.

It now remains for us to consider the last type of feed-water heaters generally known as

CLOSED OR ❖ ❖ ❖ PRESSURE HEATERS

THE principal of these consists in keeping the exhaust steam from actual contact with the feed-water, by the interposition between the two of a metallic surface through which, however, the heat of the one is readily transmitted to the other.

For purposes of strength and simplicity of construction, they generally consist of one or more tubes enclosed in a cylindrical shell. In some cases the water is in the shell and the exhaust steam in the tubes. These are called steam tube heaters, while those constructed on the reverse plan are water tube heaters.

In either case the water is forced by the pump through the apparatus as if it were but a part of the feed pipe, and into the boiler against the pressure of the steam, the heater being subjected to the same pressure as the boiler, hence the generic name of closed or pressure heaters.

As the action of the fatty acids, due to the decomposition of entrained cylinder oil or grease, would soon destroy the tubes, they have to be made of brass or copper, but as the linear expansion of these metals under heat is greater than that of the iron shell, some provision must be made to allow for this expansion, which otherwise would cause the tubes, if rigidly connected, to start from their fastenings, producing leaks and rendering the apparatus unsafe and useless.

In the means devised to overcome this differential expansion lies mainly the difference between the various heaters in the market.



The simplest is the coil heater, in which one or more tubes are bent in shape like a coil spring or cork-screw. While effective for heating when clean, this construction precludes the removal of scale and with hard water the heater soon becomes inoperative.

Heaters in which the tubes are bent in the shape of a U or horseshoe are open to the same objection when the water is in the tubes. If of the steam tube type, the sediment, mud and scale, settles at the bottom of the shell among the nest of tubes, and unless of such nature as to be readily blown off, its removal is a practical impossibility.



In another case the tubes are corrugated, a sort of bellows action being claimed. Others run the ends of the tubes through stuffing boxes. Any engineer who knows the difficulty of keeping a valve steam-tight under boiler pressure may imagine a hundred of these located where they cannot be reached without stopping the plant and taking the heater apart.



What then is the best form of feed-water heater for general use?

Whenever exhaust steam is available it should be used to heat the feed-water in preference to the waste furnace gases, as not only the efficiency is considerably greater, but the first cost of the apparatus required is much less.

If, however, through improper construction or on account of undue forcing, the hot gases leave the boilers at an abnormally high temperature, it may prove advantageous to use a flue heater or economizer, in addition to the exhaust heater, as the latter under ordinary conditions will not heat the water higher than 212 degrees Fahr., and the temperature may be raised still higher in the economizer.

It then becomes a question of figuring the additional saving against the interest on first cost and the yearly expense for extra labor and upkeep.



In no instance should an open heater be used, unless the steam is free of oil.



When the feed-water is hard it should be treated in a live steam purifier which will remove all the scale forming salts without danger to the boilers, while in the exhaust open heater only the carbonates of lime and magnesia will be precipitated,

and these to not much greater extent than can be done in a properly constructed closed or pressure heater.



As to the best construction of the pressure heater, the following general principles appear self evident.

No part exposed to the exhaust steam should be of wrought iron or steel, for these are quickly pitted and destroyed by fatty acids. The best materials will be found in copper, brass and cast iron; the tubes being necessarily made of the first metals and the shell of the last.

But as these metals under the influence of heat do not expand to the same extent, some provision should be made in the construction to allow for the differential expansion. No weak element, however, should be introduced in the parts of the apparatus subject to boiler pressure.

The tubes should be straight and easily accessible for cleaning, the reason being obvious.

Some well or receptacle removed from the heating surfaces should be provided where the water is quiescent and the fine particles of sediment can settle, undisturbed by the circulation of the heated water.

The circulation should be positive, insuring an even distribution of the water to all the parts of the heating surface.

No obstruction should be offered to the passage of the exhaust through the heater that may tend to cause back pressure on the engines.

The exponent of all these principles, carried out in their best form, will be found in the following pages descriptive of

THE GOUBERT ✂ ✂ ✂ FEED-WATER HEATER

PRICE LISTS

PAGES 26-30

THE GOUBERT ✕ ✕ ✕ FEED-WATER HEATER

THE construction of the Goubert Feed-Water Heater will be readily understood by referring to the engraving.

The apparatus, as illustrated on page 15, is essentially composed of two cast-iron water chambers connected together by a cluster of seamless drawn brass tubes, which are rigidly secured at their ends to the tube plates by means of a roller tube expander, in the same manner that boiler tubes are secured to the heads.

These are the only parts of the heater under boiler pressure, and their shape is of the strongest possible form to withstand the various strains. As may be seen, the whole upper chamber which is carried solely by the tubes, is free to move up or down as these expand or contract under the influence of varying temperatures.

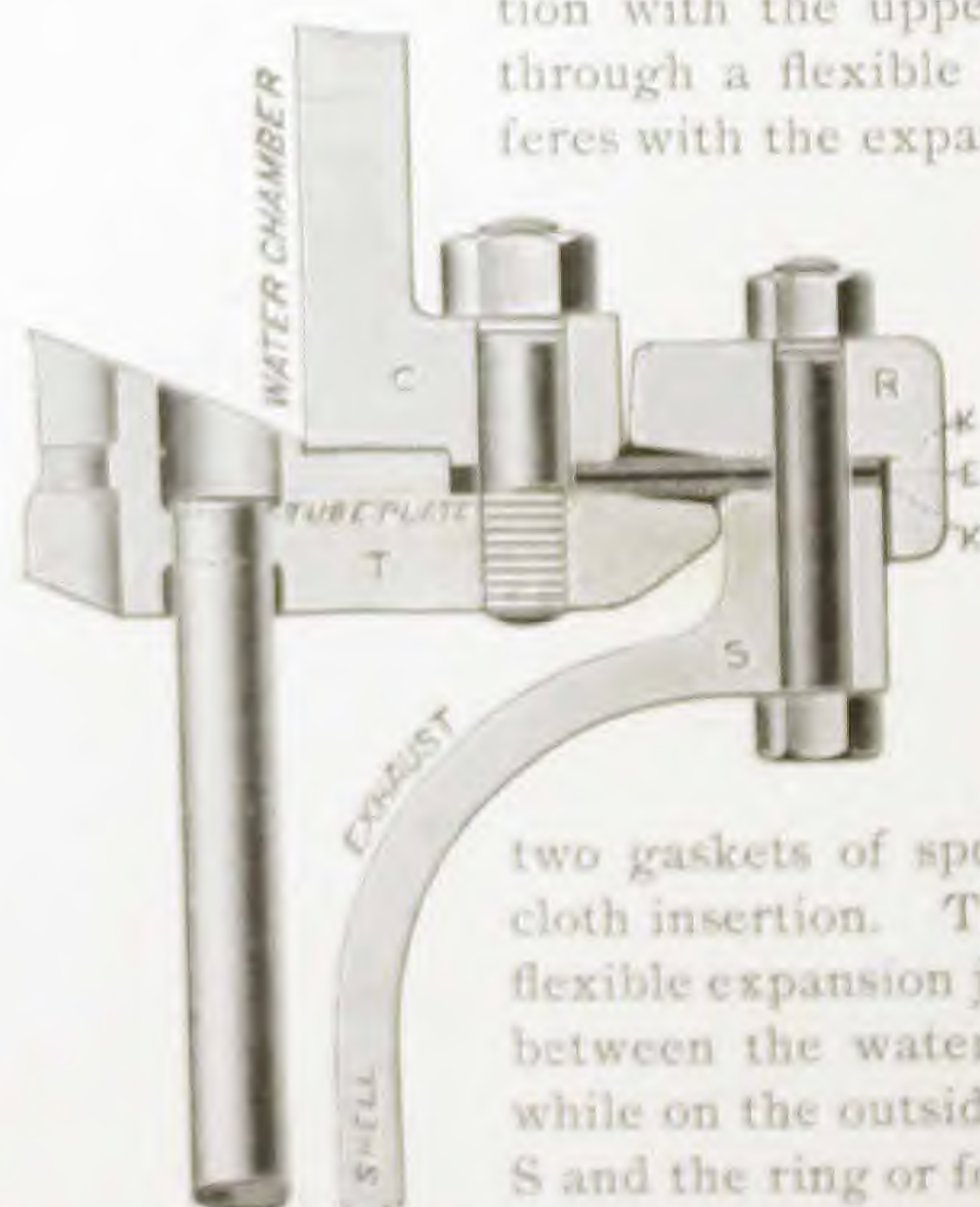
The object of the cast iron shell surrounding the tubes, is merely to provide an envelope for the exhaust steam. The shell is consequently subjected to no particular pressure, and while it is bolted to the lower water chamber, its only connection with the upper movable water chamber is

through a flexible joint which in no way interferes with the expansion of the tubes, and merely

serves to make a seal between the tube plate and the shell, thus avoiding the possible escape of exhaust steam into the room.

The expansion joint is shown in detail by the sectional cut, in which E is a ring or gasket of soft annealed copper, and K, K,

two gaskets of special packing with brass wire cloth insertion. These three gaskets forming a flexible expansion joint are clamped on the inside between the water chamber C and the tube T, while on the outside they are secured by the shell S and the ring or follower R. No pressure ordinarily comes upon this expansion joint, as the exhaust under-



arily comes upon this expansion joint, as the exhaust under-

neath and the atmosphere above are practically equalized; although it will be seen that the special shape of the tube plate and the follower ring offer an efficient backing for the expansion gaskets so as to enable them to withstand any amount of pressure that may be put upon the shell. On the other hand, it will also be seen that the pressure joint between the water-chamber C and the tube plate T is made independent of the expansion joint, and can be screwed down as hard as may be necessary to withstand the boiler pressure without in any way affecting the flexible joint.

At the extremes of temperature the differential expansion between the tubes and the shell is rarely more than three thirty-secondths of an inch, so that the expansion joint has to move but three sixty-fourths above or below the horizontal.

It must be remembered that this is the only weak element in the apparatus; that it is not subjected to pressure; that its destruction in no way interferes with the practical working of the heater; that in constant service it will last for years, and that its renewal amounts to no more than the replacing of a gasket on a cylinder head or an ordinary steam pipe.

While our latest type, illustrated on the opposite page overcomes whatever objection may have heretofore been raised in this respect and makes the expansion joint practically indestructible.



The operation of the Goubert Feed-Water Heater is as simple as its construction.

The exhaust steam from the engine is admitted to the shell through the nozzle on one side and, spreading between the tubes, impinges upon them on its passage across to the outlet on the opposite side, while the aggregate area of the spaces between the tubes is so much larger than that of the exhaust pipe that no obstruction is offered to the flow of the steam, and absolutely no back pressure reverts upon the engine.

The water of condensation is removed by the drip pipe, which should be kept always open, and it is a peculiarity of the construction of this heater that the oil or grease in the steam is almost entirely removed and passes off with the drip, leaving the remainder of the exhaust free from contamination and available for other purposes for which live steam has ordinarily to be used.

The cold feed-water enters at the bottom of the apparatus, is spread by the deflector, and passing under the edge of the latter in a thin sheet allows the particles of mud or sediment it carries to settle, undisturbed, in the bottom of the water-chamber, there being no heat at this point and consequently no circulation.

The water then flows upward through the tubes, and being divided up in small streams becomes quickly heated; as each tube is surrounded by steam no heat is lost by radiation before the water leaves the heater, a result that some makers of steam tube heaters have endeavored to attain by surrounding the shell with a steam jacket.

The construction of the upper water-chamber, similar to that of the lower one, permits the rise of scum to the top and its subsequent removal through the surface blow. A mud blow-off pipe is also provided in the bottom chamber.

The Goubert Feed-Water Heater is particularly easy to clean. By lifting the top chamber the ends of all the tubes are exposed; a swab or brush may then be used to clean the tubes. This, however, needs but rarely to be done, and if the surface and mud blows be open for a few seconds every day, the heater is readily kept clean and very little sediment is ever found to adhere to the interior surfaces of the tubes.

By leaving the blow-off valve open at night, or when not in use, the heater can be thoroughly drained to avoid the danger of freezing in cold weather.

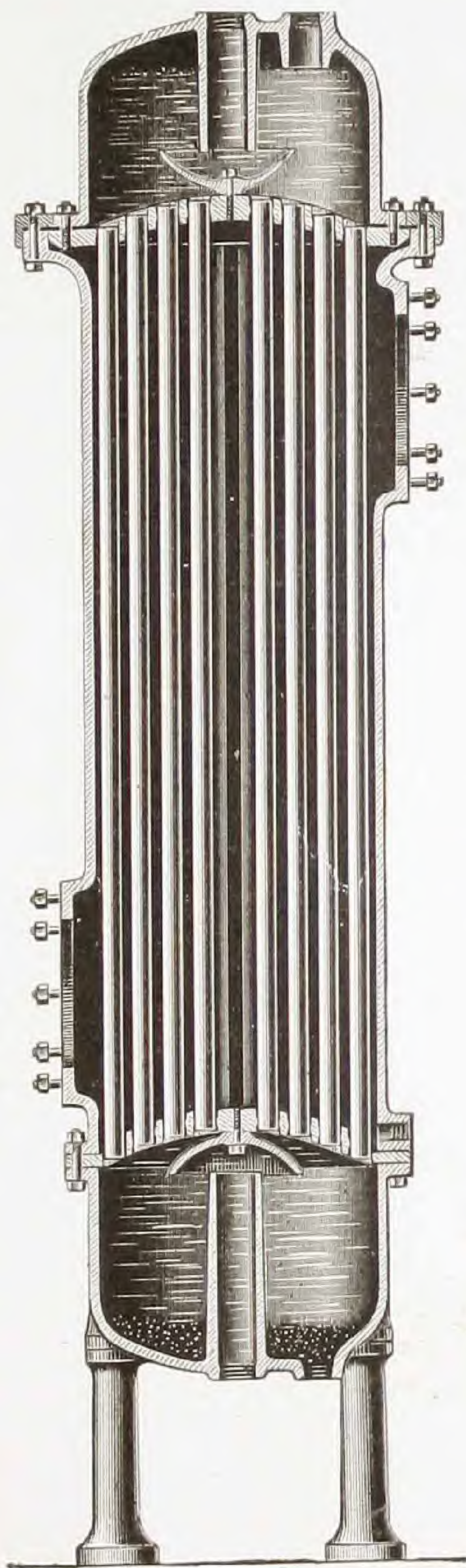
Every heater is tested under 250 pounds pressure.

Safe working pressure 175 pounds.

Our type B Vertical Heater, more especially adapted to the larger sizes, will be found illustrated and described on pages 16 and 17.

PRICE LISTS

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The Goubert Feed-Water Heater.
(Vertical Type A.)

TYPE B * * * * *

VERTICAL HEATERS

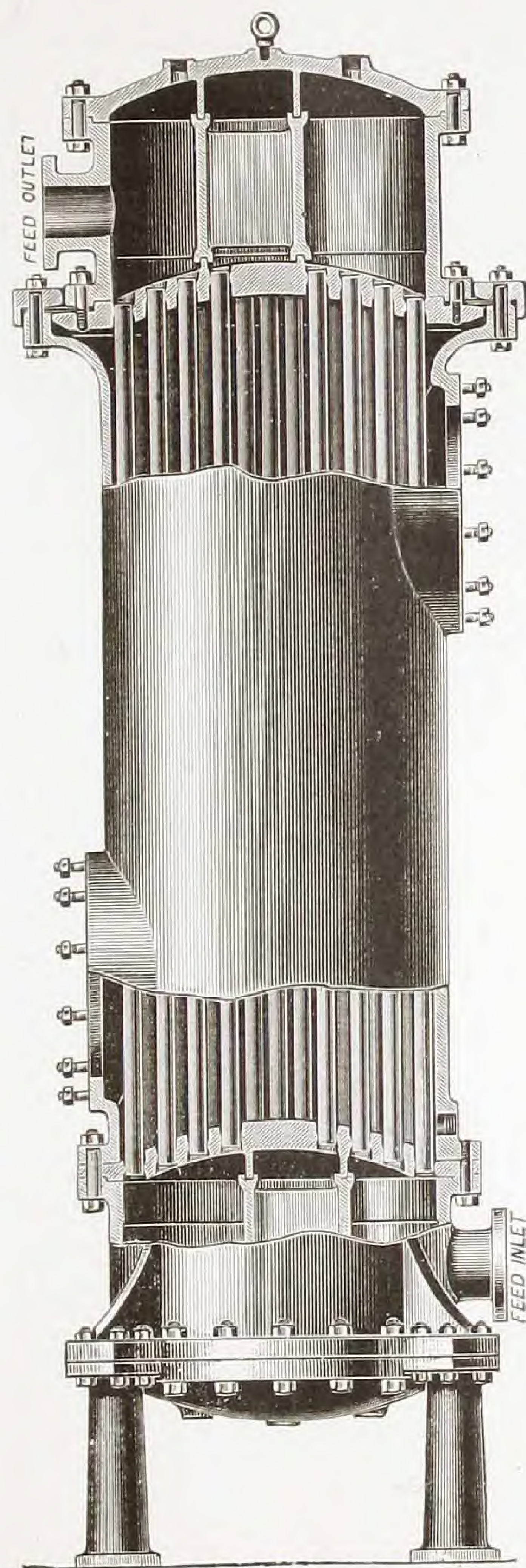
THE illustration opposite shows a modification in the construction of the Goubert Feed-Water Heater that we have adopted for large vertical units. This construction is essentially the same as that of our horizontal type, illustrated on page 19, and while not affording as good facilities for the separation and collection of sediment as the heater described in the foregoing pages, the heating surface is rendered more effective by increased velocity of flow and better distribution of the water.

It will also be seen that the end bonnets can be readily removed for inspection, cleaning or repairs without disturbing the pipe connections, an important feature in apparatus of large size.

We recommend this type of heater for sizes from 1,500 to 5,000 horse power.

Although the peculiar effectiveness of this type of heater has been lately rediscovered by some of our competitors and hailed as new and wonderful, we beg to call attention to the fact that we have been manufacturing this heater for ten years past in both vertical and horizontal types, hundreds of them being in use and giving the most perfect satisfaction.

<p>PRICE LISTS</p> <p>PAGES 26-30</p>



The Goubert Feed-Water Heater.
(Vertical Type B.)

HORIZONTAL HEATERS ❀❀

WHILE we recommend that our vertical type of Heaters, described in the foregoing pages, be always used wherever the height of room will permit, there are many places, as in cellars of city buildings, where the want of head room precludes its adoption.

To meet this difficulty we manufacture a Horizontal Heater, as illustrated on the opposite page, which, while preserving the advantages of construction that have made our vertical type so successful, may be used in all places of limited height.

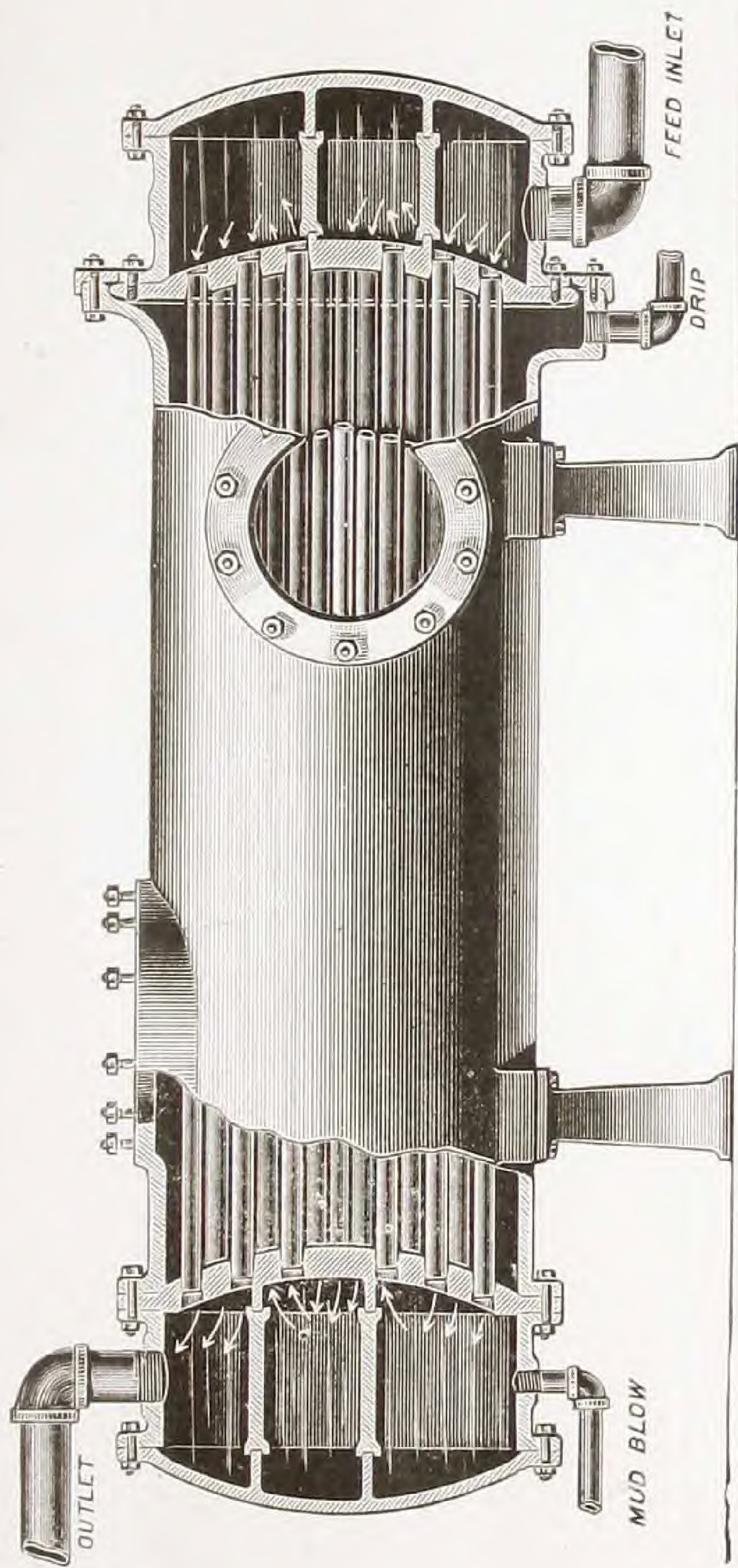
This Horizontal Heater is also specially adapted for use in connection with condensing engines, as the steam nozzles can be placed in any position required; the inlet nozzle may be directly under the engine exhaust and the outlet nozzle bolted to the top of the condenser,—this arrangement practically taking the place of the exhaust pipe, making a very neat connection.

The method used in our type B to cause a positive circulation of the water by the dividing of the water chambers into compartments, is in the Horizontal type an absolute necessity, greatly increasing the efficiency and without which no satisfactory results can be secured. We therefore build in this manner all sizes of our Horizontal Heaters from 50 to 5,000 horse power.

The Heater is shown in the engraving as resting on a pair of columns, but it may be provided, instead, with lugs or bolts or straps, to be hung from the ceiling; it may also be supported by beams or saddles.

PRICE LISTS

PAGES 26-30



The Goubert Feed-Water Heater.

(Horizontal Type.)

DIRECTIONS FOR ❁ ❁ ❁ ❁ ERECTING AND RUNNING THE GOUBERT FEED-WATER HEATER

THE engraving on the opposite page clearly illustrates what we consider one of the best modes of connecting up our apparatus.

The location of the heater in relation to the engine, the boilers, or the buildings, will, of course, necessitate, in many instances, some departure from the exact arrangement shown, but we recommend that in any case the general idea be carried out.

It is, however, a peculiarity of this heater that the exhaust may be admitted, if more convenient, through the upper nozzle, and the outlet to the roof connected to the lower one.

Make all feed and blow-off connections with union couplings, so that the heater may be readily taken apart for inspection.

Use straightway valves, or still better, plug cocks in the blow-off pipes.

Be sure to put a safety-valve on the feed-pipe; let this be loaded at a pressure of say 15 to 20 pounds above that you wish to carry on your boilers.

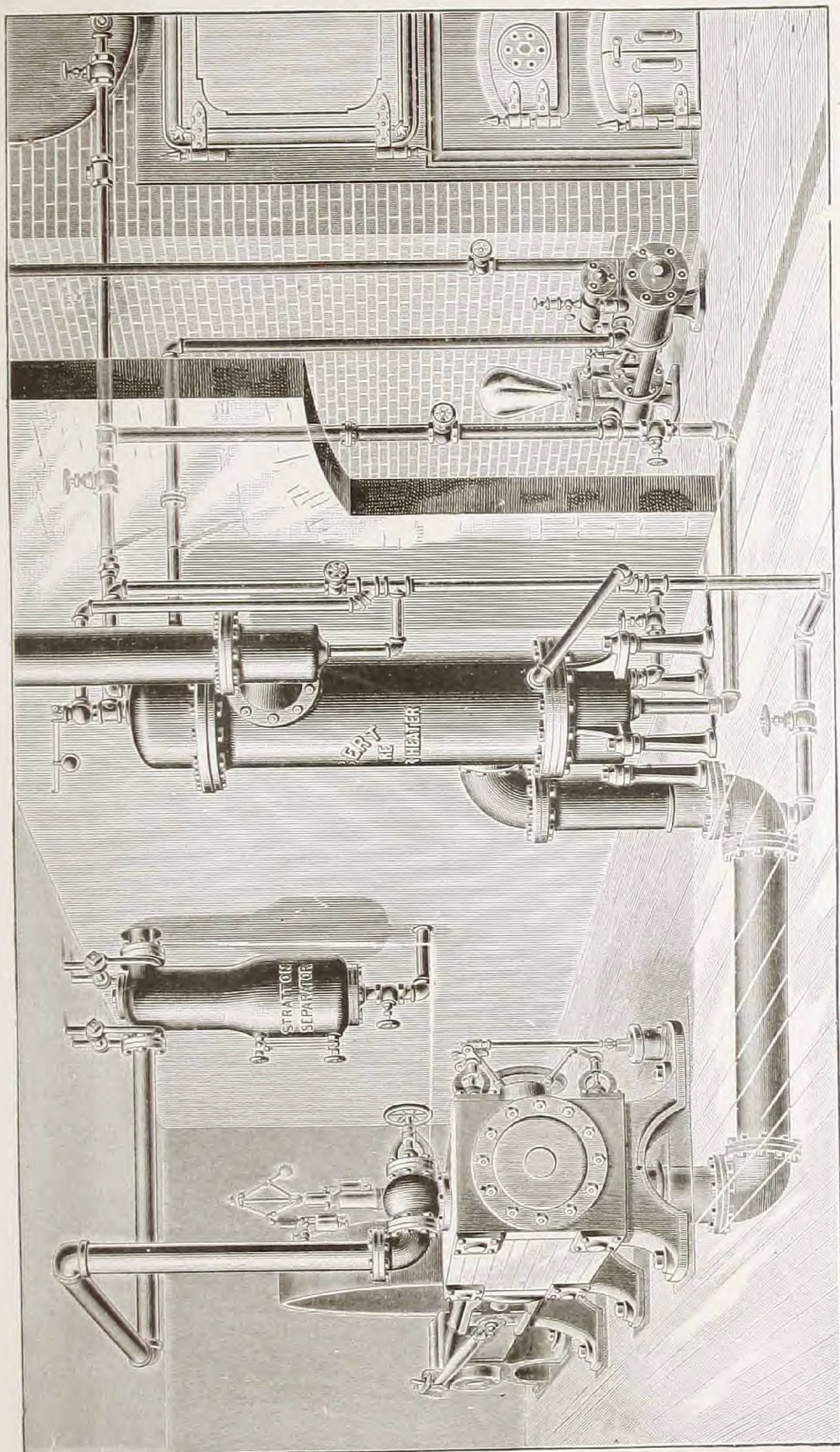
If the safety-valve leaks get a new one, but never hang on an additional weight to stop the leak, as this may add a load of several hundred pounds per square inch.

Run the drip-pipe the full size, with as few bends as possible; run it with a downward incline if you can; if you have a drop in it let it be close to the heater, so that the water may gain headway from the start. If you put a valve in the drip, see that it be always open while the heater is in use.

Run the feed pump slowly and continuously. You cannot expect to heat the water as hot if you pump through in five minutes what the heater is calculated to heat in half an hour.

Open the blow-off wide for a few seconds several times a day and always while the pump is running.

By following these directions you will obtain the maximum economy, and will never have any trouble with your heater.



Arrangement of Piping and Connections for the Goubert Vertical Feed-Water Heater.

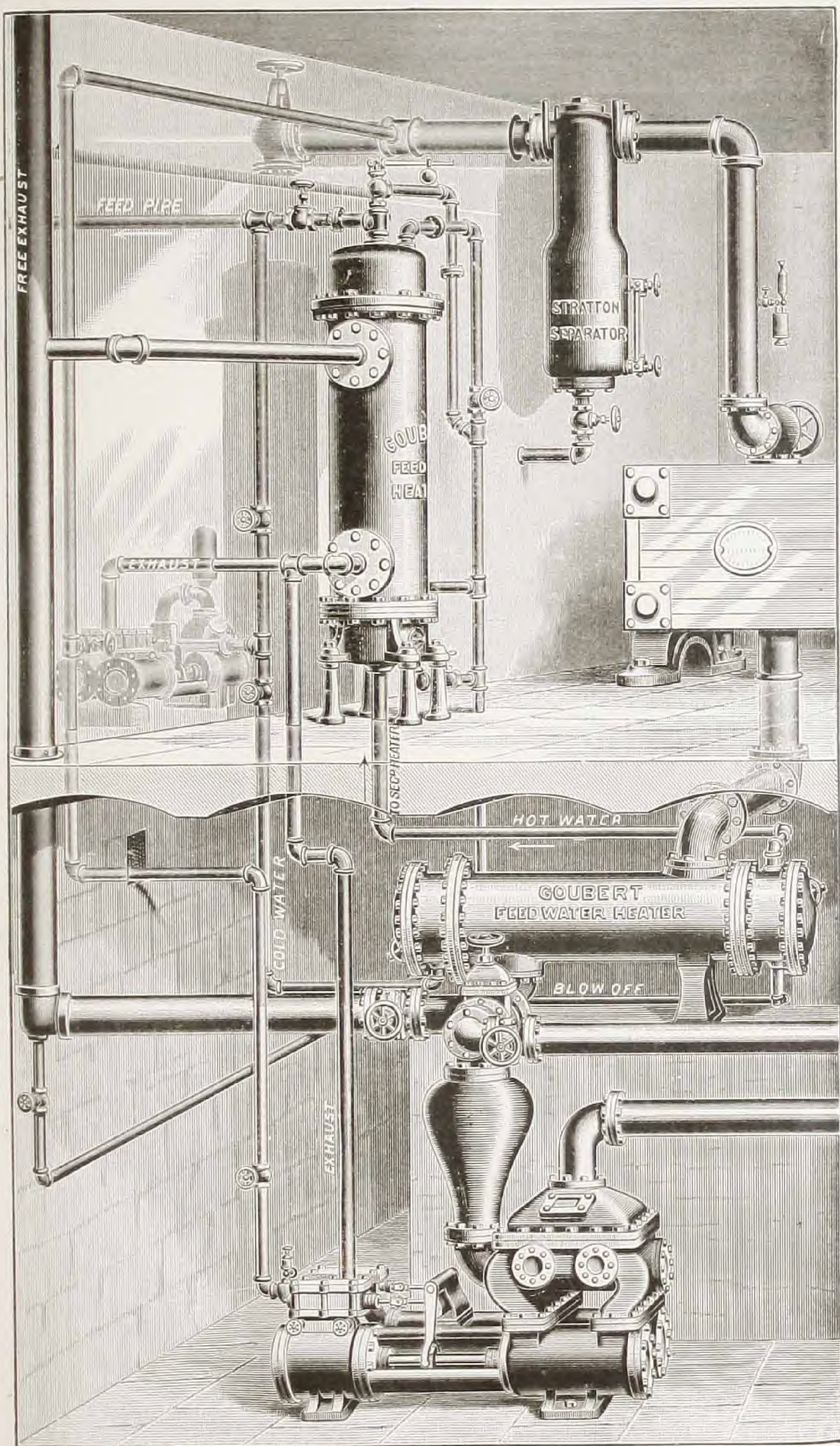
ON THE USE OF ❖ ❖ ❖ ❖ ❖
HEATERS WITH ❖ ❖ ❖
CONDENSING ENGINES

AN opinion seems to prevail among manufacturers and users of condensing engines, that the use of a feed-water heater placed in the path of the steam between engine and condenser is of no particular benefit, and rather detrimental than otherwise. This may be true of heaters in which steam passes through the interior of the tubes, as the increased friction and obstruction due to the length and limited area of the tubes may cause a back pressure which materially reduces the vacuum in the cylinder, and it is not unusual that, with 26 inches vacuum in the condenser, only about 18 or 20 inches are obtained in the cylinder.

This is not the case, however, with the Goubert Feed-Water Heater, as the area for the passage of the steam through the shell is so large that it affords no impediment, and the heater, being itself a condenser, tends to increase the vacuum.

With a vacuum of 26 inches, a temperature of 120 degrees in the feed-water may readily be obtained, and that means a saving of at least 6 per cent. of fuel over feeding cold water; but if the steam from the boiler feed-pumps, air, or circulating pumps is used, or other sources of exhaust steam supply are available, and these be turned into a second heater through which is passed the water from the first heater already primed to 120 degrees, the feed may easily be raised to 200 degrees, and practically as good results obtained as if the engine were non-condensing. The drawing on opposite page shows an excellent arrangement of primary and supplementary heaters as above described.

<p>PRICE LISTS PAGES 26-30</p>



Arrangement of Primary and Supplementary Heaters
in connection with Condensing Engine.

THE GOUBERT FEED-WATER HEATER WITH SINGLE ✂ ✂ ✂ ✂ ✂ EXHAUST CONNECTION ✂

THE illustration on opposite page shows a method of connecting the Goubert Feed-Water Heater, which has proved very successful wherever used.

As will be seen, a free exhaust passage to the atmosphere is maintained at all times, while the heater can be cut out by closing the valves for cleaning or repairs.

The steam is admitted through the large connection, the small return pipe at the top being intended to prevent any accumulation of air, while at the same time inducing a circulation of the steam in a certain measure.

It must be remembered that a feed-water heater is practically a condenser, and that as the steam in contact with the tubes is condensed, more steam will be drawn from the main exhaust supply, to fill the space, just as a condenser would.

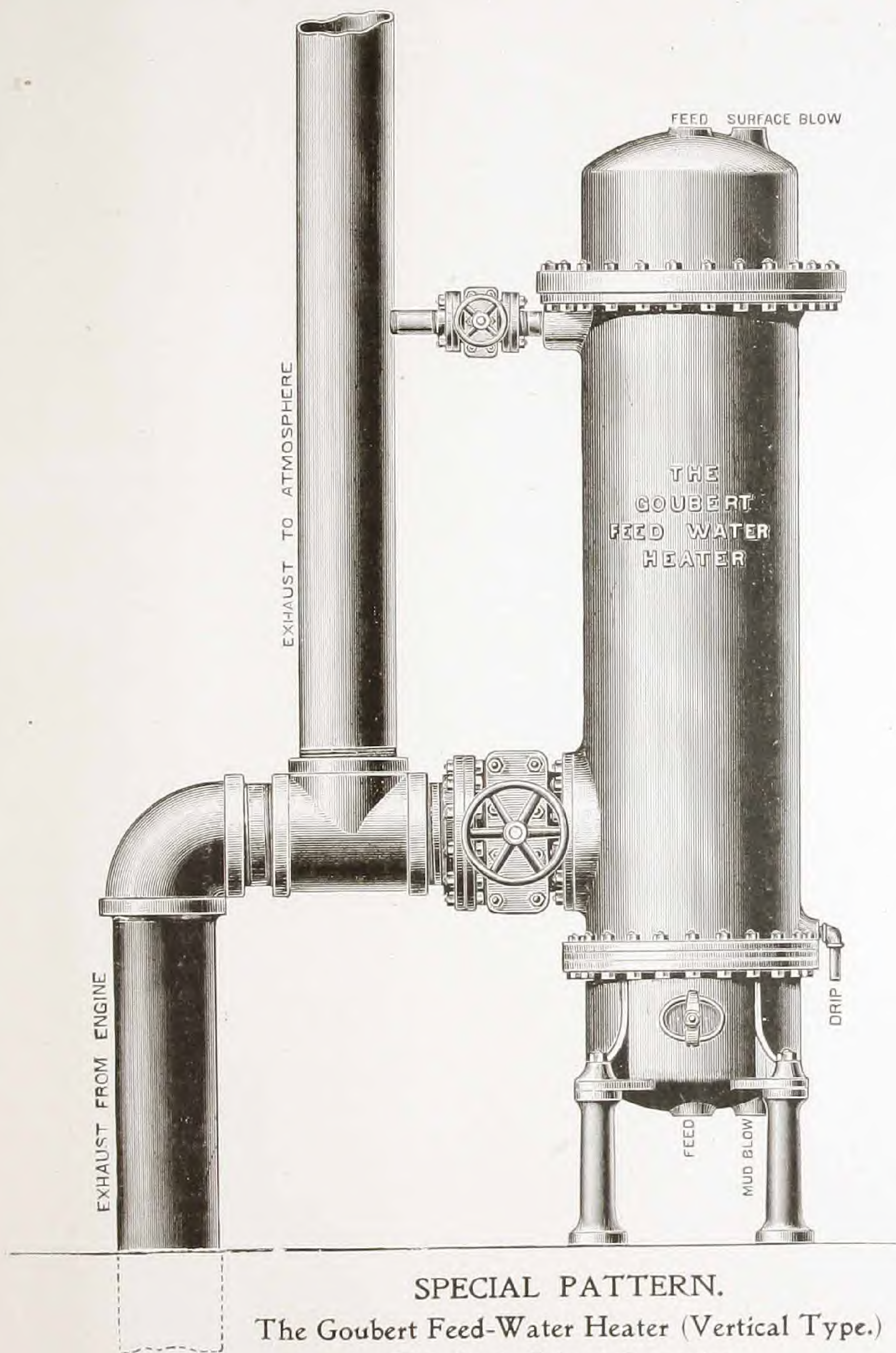
The advantage of this arrangement is often found in making connections, as the heater can be placed in any convenient location in the engine or boiler rooms without regard to the location of the main exhaust pipe.

The illustration shows the two in close proximity, but they can in practice be placed much farther apart; this being one of the many peculiar advantages of the Goubert Feed-Water Heater.

We also make this type for use as a vacuum heater, the results being equally satisfactory.

PRICE LISTS

PAGES 26-30



PRICE LIST

of the

GOUBERT FEED-WATER HEATER.

VERTICAL PATTERN.

No.	Horse Power	Diam. of Shell	Total Height on Legs		Diam. of Exhaust	Feed Pipe	Number of Tubes	Diam. of Tubes	Length of Tubes	Tube Heating Surface Sq. Ft.	Approximate Shipping Weight	Price f. o. b. New York
		ins.	ft.	ins.	ins.	ins.		ins.	ins.		lbs.	
1	50	12	5	4	6	1½	18	1¼	35⅝	17	880	.....
2	60	12	5	11	6	1½	18	1¼	42½	20	900	.....
3	70	12	6	6	6	1½	18	1¼	49⅜	23	950	.....
4	80	12	7	0	6	1½	18	1¼	56¼	27	1000	.....
5	100	12	8	2	6	1½	18	1¼	70	33	1125	.....
6	130	16	6	4	8	2	36	1¼	45¾	43	1250	.....
7	160	16	7	2	8	2	36	1¼	56	53	1550	.....
8	200	16	8	4	8	2	36	1¼	69⅝	67	1700	.....
9	240	16	9	5	8	2	36	1¼	83¼	80	1900	.....
10	300	21	8	9	10	2½	60	1¼	62¾	100	2500	.....
11	350	21	9	7	10	2½	60	1¼	73	117	2800	.....
12	400	21	10	5	10	2½	60	1¼	83¼	133	2900	.....
13	500	25	9	7	12	3	90	1¼	69⅞	167	3800	.....
14	600	25	10	8	12	3	90	1¼	83⅜	200	4000	.....
15	700	25	11	10	12	3	90	1¼	96⅞	233	4400	.....
16	800	29	10	8	16	4	126	1¼	78⅞	266	5000	.....
17	900	29	11	7	16	4	126	1¼	88⅜	300	5500	.....
18	1000	29	12	4	16	4	126	1¼	97⅞	333	5800	.....
19	1200	29	14	0	16	4	126	1¼	117⅞	400	6300	.....
20	1500	34	14	4	18	5	150	1⅜	112⅞	500	9200	.....
21	1800	34	16	2	18	5	150	1⅜	135	600	11000	.....
22	2000	39	13	8	22	6	186	1½	111⅜	667	14000	.....
23	2500	39	15	11	22	6	186	1½	138⅞	833	16000	.....
24	3000	44	18	4	24	6	210	1½	147½	1000	18500	.....
25	3500	48	17	11	24	6	282	1½	128⅜	1167	21000	.....
26	4000	48	19	5	24	6	282	1½	146⅜	1333	27000	.....
27	5000	60	17	4	30	8	348	1½	148⅜	1667	35000	.....

The exhaust nozzles on the shell can be arranged in any desired position. No companion flanges will be furnished unless specifically ordered.



The Goubert Feed-Water Heater.
(Vertical Type A.)

PRICE LIST

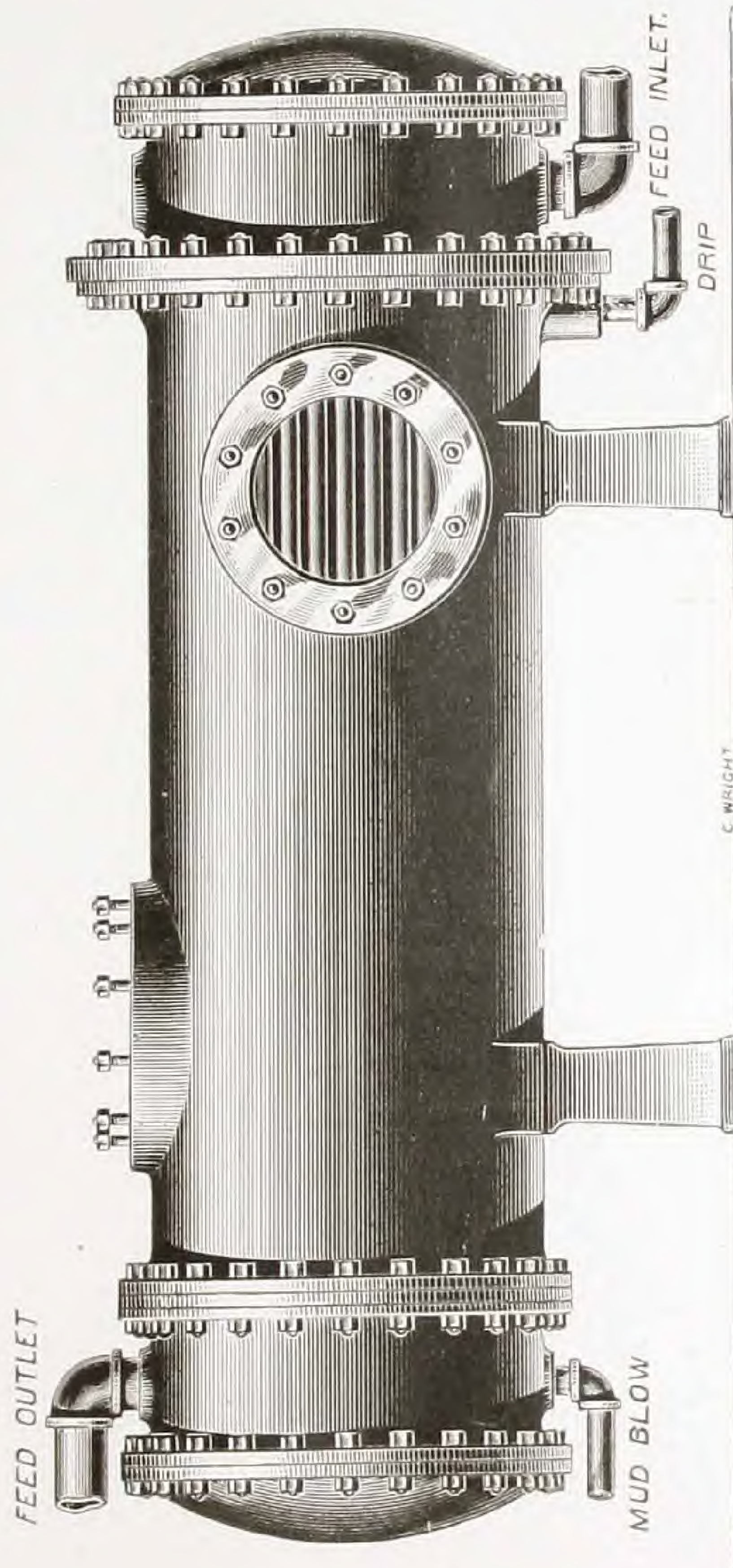
of the

GOUBERT FEED-WATER HEATER.

HORIZONTAL PATTERN.

No.	Horse Power	Diam. of Shell	Total Height on Legs	Total Length	Diam. of Exhaust	Feed Pipe	Number of Tubes	Diam. of Tubes	Length of Tubes	Tube Heating Surface Sq. Ft.	Approximate Shipping Weight	Price f. o. b. New York
		ins.	ft. ins.	ft. ins.	ins.	ins.		ins.	ins.		lbs.	
1	50	12	2 6	4 7	6	1½	18	1¼	35⅝	17	950	.....
2	60	12	2 6	5 2	6	1½	18	1¼	42½	20	1000	.....
3	70	12	2 6	5 8	6	1½	18	1¼	49⅜	23	1050	.....
4	80	12	2 6	6 3	6	1½	18	1¼	56¼	27	1250	.....
5	100	12	2 6	7 5	6	1½	18	1¼	70	33	1400	.....
6	130	16	3 0	5 7	8	2	36	1¼	45¾	43	1675	.....
7	160	16	3 0	6 5	8	2	36	1¼	56	53	1750	.....
8	200	16	3 0	7 7	8	2	36	1¼	69⅝	67	1900	.....
9	240	16	3 0	8 8	8	2	36	1¼	83¼	80	2000	.....
10	300	21	3 5	7 3	10	2½	60	1¼	62¾	100	2600	.....
11	350	21	3 5	8 1	10	2½	60	1¼	73	117	2900	.....
12	400	21	3 5	9 0	10	2½	60	1¼	83¼	133	3200	.....
13	500	25	3 10	8 2	12	3	90	1¼	69⅞	167	4100	.....
14	600	25	3 10	9 4	12	3	90	1¼	83⅜	200	4300	.....
15	700	25	3 10	10 5	12	3	90	1¼	96⅞	233	4700	.....
16	800	29	4 3	9 2	16	4	126	1¼	78⅞	267	5500	.....
17	900	29	4 3	10 1	16	4	126	1¼	88⅜	300	6000	.....
18	1000	29	4 3	10 10	16	4	126	1¼	97⅞	333	6500	.....
19	1200	29	4 3	12 5	16	4	126	1¼	117⅞	400	7200	.....
20	1500	34	4 11	13 5	18	5	150	1⅜	112⅞	500	10000	.....
21	1800	34	4 11	15 3	18	5	150	1⅜	135	600	12000	.....
22	2000	39	5 6	13 10	22	6	186	1½	111⅜	667	14000	.....
23	2500	39	5 6	16 1	22	6	186	1½	138⅞	833	16000	.....
24	3000	44	6 0	17 1	24	6	210	1½	147½	1000	18500	.....
25	3500	48	7 0	16 0	24	6	282	1½	128⅜	1167	21000	.....
26	4000	55	7 0	17 6	24	6	282	1½	146⅜	1333	27000	.....
27	5000	64	7 9	14 10	30	8	348	1½	148⅜	1667	35000	.....

The exhaust nozzles on the shell can be arranged in any desired position. No companion flanges will be furnished unless specifically ordered.



The Goubert Feed-Water Heater.
(Horizontal Type.)

THE GOUBERT ❀ ❀ ❀ ❀ DISTILLING CONDENSER

THE Goubert Distilling Condenser, as illustrated on opposite page, is designed especially for ice manufacturers.

The general outlines are similar to the Goubert Feed-Water Heater, but with changes intended to produce a surface-condenser of great efficiency and durability, free from the many defects that are common to such appliances.

All parts of the apparatus are cast iron excepting the tubes, which are brass, tinned inside and outside, and in cases where salt circulating water is used, the tube plates are made of bronze, to insure against corrosive action of sea water.

The tubes are rigidly expanded into the tube plates by means of a roller-tube expander, the differential expansion between brass tubes and iron shell being taken up and provided for by the flexible copper expansion-joint, explained and illustrated on page 12.

The tubes are straight and of large diameter, to facilitate cleaning and thus prevent scale deposit. Special provision is made for cleaning and ease in repairing, as it will be noticed by reference to cut on opposite page that not only are hand-holes provided, but the covering plates on each end of the apparatus may be readily removed *without disturbing any pipe connections whatsoever*, and thus every tube exposed to view for the purpose of removing scale, cleaning, or, in case of necessity, repairs.

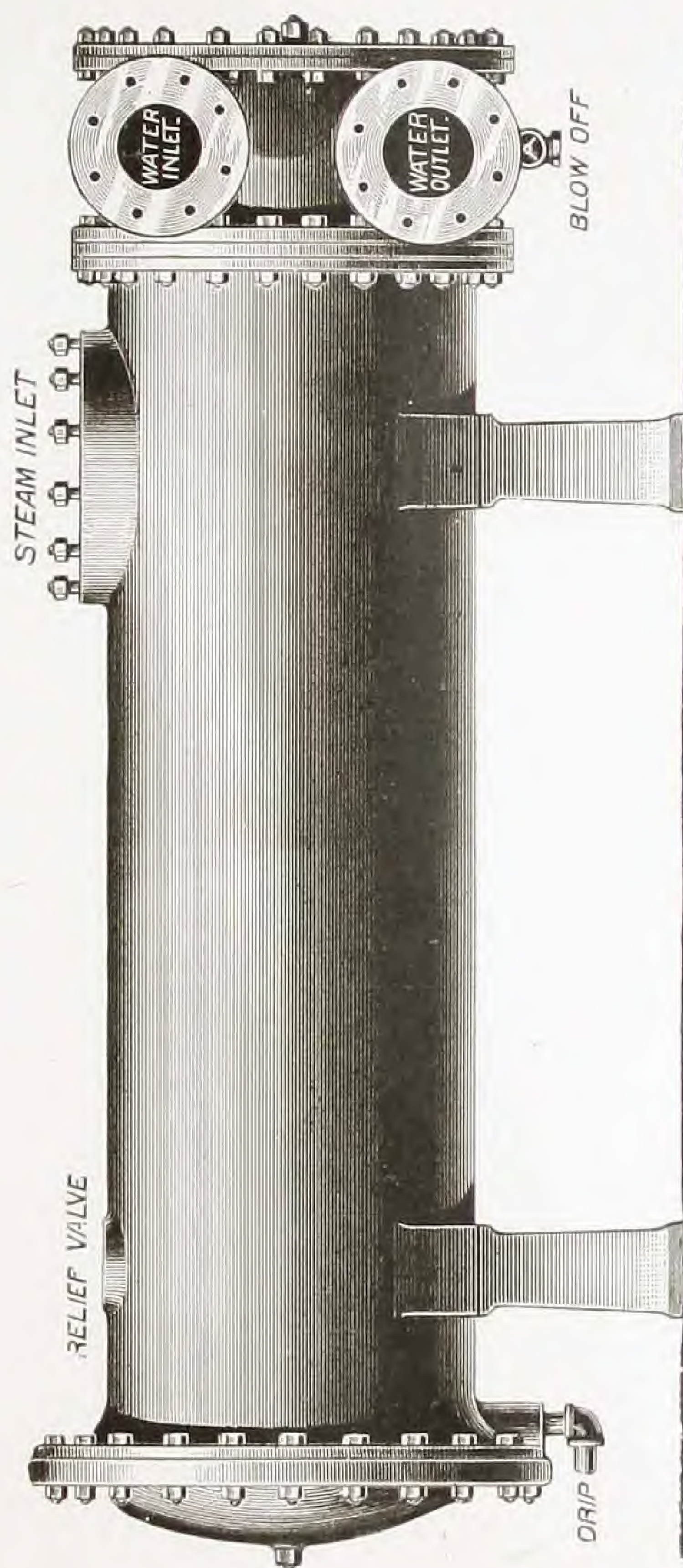
The interior iron surfaces are coated with a metallic varnish that will withstand 212 degrees Fahr., thus entirely avoiding corrosion, rusty water, and consequently poor quality of ice; when salt water is used for condensing, the tube plates are made of bronze, tinned on both sides.

The water connections are both on the same end and on side of condenser, to secure the utmost efficiency and for convenience in pipe-fitting.

PRICE LIST

Condensation of Steam in 24 hours	Diam. Shell.	Total Length.		Total Height.		Diameter Water Pipe.	Diameter Drip Pipe.	Diameter Exhaust.	Approximate Shipping Weight.	Price f. o. b. New York, with Iron Tube Plates.	Price f. o. b. New York, with Bronze Tube Plates.
		ft.	ins.	ft.	ins.	ins.	ins.	ins.	lbs.		
Tons.	ins.										
10	13	5	0	2	9	3	2	6	1200	.....	.....
15	13	7	1 1/2	2	9	3	2	6	1300	.....	.....
20	16	6	1	3	0	3	2	8	1500	.....	.....
25	16	7	2	3	0	3	2	8	1650	.....	.....
30	16	8	5	3	0	3	2	8	1800	.....	.....
35	21	7	5	3	5	4	2	10	2700	.....	.....
40	21	8	8	3	5	4	2	10	2900	.....	.....
50	21	10	2	3	5	4	2	10	3200	.....	.....
60	25	7	7	3	10	5	2 1/2	12	3700	.....	.....
75	25	8	10	3	10	5	2 1/2	12	4000	.....	.....
90	25	10	4	3	10	5	2 1/2	12	4400	.....	.....
120	29	10	6	4	3	6	3	16	5800	.....	.....

The above prices include flanges bolted on for water and exhaust connections.



The Goubert Distilling Condensers for Ice Machines.

Percentage of Fuel Saved by Heating Feed-Water

(STEAM PRESSURE 60 POUNDS)

		TEMPERATURE OF WATER ENTERING BOILER												
Initial Temperature of Water Entering Heater	Heat Units Absorbed in Generating Steam.	120°	140°	160°	180°	200°	202°	204°	206°	208°	210°	212°	214°	216°
32°	1175	7.49	9.19	10.89	12.59	14.30	14.47	14.64	14.81	14.98	15.15	15.32	15.49	15.66
40	1167	6.86	8.57	10.28	12.00	13.71	13.88	14.05	14.22	14.40	14.57	14.74	14.91	15.08
50	1157	6.05	7.78	9.51	11.24	12.97	13.14	13.32	13.49	13.66	13.83	14.00	14.18	14.35
60	1147	5.23	6.97	8.72	10.46	12.21	12.38	12.55	12.73	12.90	13.08	13.25	13.43	13.60
70	1137	4.41	6.16	7.91	9.67	11.43	11.61	11.78	11.96	12.14	12.31	12.49	12.66	12.84
80	1127	3.44	5.32	7.10	8.87	10.65	10.82	11.00	11.18	11.36	11.53	11.71	11.89	12.07
90	1117	2.68	4.47	6.26	8.06	9.85	10.03	10.21	10.38	10.56	10.74	10.92	11.10	11.28
100	1107	1.80	3.61	5.42	7.23	9.03	9.21	9.39	9.57	9.75	9.93	10.11	10.29	10.47
110	1097	.91	2.73	4.55	6.38	8.20	8.38	8.56	8.74	8.93	9.11	9.29	9.47	9.66
120	1087	—	1.84	3.67	5.51	7.35	7.54	7.77	7.90	8.09	8.27	8.45	8.64	8.82

Table Showing the Yearly Saving Effected by the Use of the Feed-Water Heater for
Various Horse Powers and at Different Prices of Coal.

Horse Power of Engine.	Coal Consumption at 4 lbs. per H. P. per hour.		Saving of 13½ Per Cent.	PRICE OF COAL PER TON OF 2240 LBS.										
	Daily.	Yearly.		\$1.50	\$2.00	\$2.50	\$3.00	\$3.50	\$4.00	\$4.50	\$5.00	\$5.50	\$6.00	
				lbs.	tons.	lbs.	tons.	lbs.	tons.	lbs.	tons.	lbs.	tons.	lbs.	tons.
50	2000	268	36.18	\$ 54	\$ 72	\$ 90	\$ 108	\$ 126	\$ 145	\$ 163	\$ 181	\$ 199	\$ 217	
60	2400	321	43.33	65	87	108	103	152	173	194	217	238	260	
70	2800	375	50.62	76	101	126	152	177	202	227	253	278	304	
80	3200	429	57.91	87	116	145	174	203	232	261	289	318	347	
100	4000	536	72.36	108	145	187	217	253	289	325	362	398	434	
120	4800	643	86.80	130	174	217	260	304	347	390	434	477	521	
160	6400	857	115.69	173	231	289	347	404	463	520	578	635	694	
200	8000	1072	144.72	217	289	362	434	506	579	651	724	796	868	
250	10000	1340	185.90	279	372	465	558	651	744	837	929	1022	1115	
300	12000	1608	226.08	339	452	565	678	791	904	1017	1130	1243	1356	
350	14000	1876	253.26	380	506	633	760	886	1013	1139	1266	1392	1519	
400	16000	2144	289.44	434	579	723	868	1013	1158	1302	1447	1591	1730	
500	20000	2680	361.80	543	724	904	1085	1267	1447	1627	1809	1990	2170	
600	24000	3216	433.30	650	867	1083	1300	1517	1733	1950	2170	2387	2600	
700	28000	3752	506.20	759	1012	1265	1518	1771	2025	2278	2531	2784	3037	
800	32000	4288	579.10	868	1158	1448	1737	2026	2316	2605	2895	3184	3474	
900	36000	4824	651.24	977	1302	1628	1954	2279	2605	2930	3256	3581	3907	
1000	40000	5360	723.60	1085	1447	1809	2170	2532	2894	3255	3618	3990	4341	

It pays dividends of from 50 to 400 per cent.

TEMPERATURE OF STEAM AND ABSOLUTE PRESSURE FOR EACH HALF INCH OF VACUUM

CALCULATED FROM C. H. PEABODY'S TABLES

Inches of Vacuum	Absolute Pressure lbs. per sq. in.	Tempera- ture Degrees Fahr.	Inches of Vacuum	Absolute Pressure lbs. per sq. in.	Tempera- ture Degrees Fahr.	Inches of Vacuum	Absolute Pressure lbs. per sq. in.	Tempera- ture Degrees Fahr.
0	14.697	212.00	10	9.785	192.23	20	4.873	161.25
½	14.451	211.15	10½	9.539	191.03	20½	4.628	159.09
1	14.206	210.29	11	9.294	189.81	21	4.382	156.83
1½	13.960	209.42	11½	9.048	188.57	21½	4.136	154.46
2	13.715	208.54	12	8.803	187.30	22	3.891	151.97
2½	13.469	207.64	12½	8.557	186.00	22½	3.755	149.34
3	13.223	206.73	13	8.311	184.66	23	3.410	146.55
3½	12.978	205.80	13½	8.066	183.29	23½	3.164	143.59
4	12.732	204.86	14	7.820	181.88	24	2.918	140.42
4½	12.487	203.91	14½	7.575	180.44	24½	2.673	137.01
5	12.241	202.94	15	7.329	178.96	25	2.427	133.32
5½	11.995	201.95	15½	7.084	177.44	25½	2.172	129.31
6	11.750	200.95	16	6.838	175.87	26	1.926	124.89
6½	11.504	199.93	16½	6.592	174.26	26½	1.680	119.94
7	11.259	198.89	17	6.347	172.59	27	1.435	114.34
7½	11.013	197.83	17½	6.101	170.86	27½	1.189	107.84
8	10.767	196.75	18	5.856	169.07	28	0.944	100.05
8½	10.522	195.65	18½	5.610	167.23	28½	0.698	90.24
9	10.276	194.53	19	5.364	165.31	29	0.453	76.80
9½	10.031	193.39	19½	5.119	163.32	29½	0.207	54.21

REFERENCES ❖ ❖ ❖

NEW YORK CITY.

	No.	Orders,	H. P.
Abendroth & Root Mfg. Co.....	1	Order	500
American Air Power Co.....	2	do	1,800
American Trading Co.....	8	do	1,520
G. Amsinck & Co.....	1	do	300
Anderson Building.....	1	do	130
Babcock & Wilcox Co.....	1	do	1,000
Baker Smith & Co.....	5	do	1,560
James Beggs & Co.....	1	do	400
Hotel Beresford.....	1	do	200
Blake & Williams.....	3	do	150
Board of Education, School No. 75.....	1	do	50
do do 93.....	1	do	50
do do 22.....	1	do	50
do do 9.....	1	do	50
do do 42.....	1	do	50
do do 119th St.....	1	do	50
do do 77.....	1	do	50
do do 14.....	1	do	50
do do 37.....	1	do	50
Brazilian Trading Co.....	1	do	70
The Bruce Estate.....	1	do	80
The Burnet Co.....	1	do	50
Cornell & Underhill.....	3	do	1,040
A. S. Cameron Steam Pump Works.....	1	do	500
Cass Realty Corp'n Building.....	1	do	200
E. Frank Coe Co.....	1	do	300
Clinton Hall Association.....	1	do	160
Cooke & Co.....	2	do	800
Columbia College.....	2	do	280
James J. Crosson & Co.....	1	do	120
Carnegie Music Hall.....	1	do	400
James Curran Mfg. Co.....	5	do	1,760
Thomas Conville Brewing Co.....	1	do	500
Central Opera House.....	1	do	500
Catholic Club.....	1	do	130
Complete Electric Construction Co.....	1	do	50
De La Vergne Refrig. Mach. Co.....	24	do	6,420
John Downey.....	1	do	80
Davidson Sons' Marble Co.....	1	do	400
Frank Dobson.....	1	do	50
Duncan Building.....	1	do	200
Empire Building.....	1	do	750
Evans, Almirall & Co.....	1	do	300
Joseph Edwards & Co.....	4	do	1,080
East Side Hide Association, Ltd.....	1	do	120
Eaton, Cole & Burnham Co.....	1	do	80
Edison Spanish Colonial Light Co.....	2	do	250
Ford, Bacon & Davis.....	3	do	1,900
Fowler & Rockwell.....	1	do	130
Gillis & Geoghegan.....	12	do	3,430
Gill Building.....	1	do	300
H. Griffin & Sons.....	1	do	50
German Club.....	1	do	80
Graham, Hinkley & Co.....	1	do	70
Hawley & Hoops.....	1	do	240
House of Refuge, Randall's Island.....	1	do	350
Hanlein & Co.....	1	do	100
Hall Steam Power Co.....	5	do	520

REFERENCES—Continued.

	No.	Orders.	H. P.
E. P. Hampson & Co.....	10	Order	2,620
Hall of Records.....	1	do	800
Hanan's Building.....	1	do	80
Wm. F. Haring.....	1	do	200
Johnson & Morris.....	1	do	70
Hugo Kainer & Co.....	1	do	160
Love Electric Traction Co.....	1	do	100
August Luchow.....	1	do	60
Luyties Brothers.....	1	do	80
J. W. Lyall.....	1	do	300
Metropolitan Street Railway Co.....	9	do	58,200
Thomas McMullin & Co.....	1	do	60
Manhattan Electric Light Co.....	2	do	3,200
W. J. Matheson Co., Ltd.....	1	do	500
Mt. Morris Electric Light Co.....	1	do	500
McKesson & Robbins.....	1	do	400
McLean Engineering Co.....	1	do	100
Manhattan Moulding Mill Co.....	1	do	80
Morgan Iron Works.....	1	do	400
Manning, Maxwell & Moore.....	2	do	790
Mohawk Building.....	1	do	160
Mulhern Steam Heating Co.....	1	do	200
New York Edison Co.....	8	do	15,800
Hotel Netherlands.....	1	do	500
Nason Mfg. Co.....	1	do	500
New York Heat, Light & Power Co.....	1	do	2,000
New York Post-Graduate Medical School and Hospital..	1	do	200
New York Mutual Gas Light Co.....	2	do	1,050
Neftel & March Co.....	1	do	160
New York Safety Steam Power Co.....	2	do	340
New York Steam Co.....	2	do	5,300
New York & Commercial Laundry.....	1	do	260
New York Hygeia Ice Co.....	1	do	800
Nicaragua Canal Construction Co.....	1	do	60
North River Beef Co.....	1	do	160
Pancoast & Rogers.....	1	do	50
Parker, Stearns & Sutton.....	1	do	100
Evening Post Building.....	1	do	200
Rector and Essner Restaurant Building.....	1	do	200
Rhineland Building.....	1	do	300
Russell & Rees.....	1	do	160
F. Roosevelt's Organ Works.....	1	do	240
E. Rutzler.....	3	do	700
Saint Regis Hotel.....	1	do	800
Saks Building.....	1	do	700
Schwarzschild & Sulzberger.....	1	do	600
Sherry Building.....	1	do	700
Singer Building.....	2	do	320
G. A. Suter & Co.....	4	do	650
Sawyer-Mann Electric Co.....	2	do	1,400
Statue of Liberty, Bedloe's Island.....	1	do	160
Suzarte & Whitney.....	2	do	250
Gustav Schock.....	3	do	1,160
S. M. Swenson & Sons.....	1	do	300
F. & M. Schaefer Brewing Co.....	3	do	830
H. B. Smith Machine Co.....	1	do	160
Safety Insulated Wire & Cable Co.....	1	do	350
The Thomas & Wylie Lithograph Co.....	1	do	160
Third Avenue Cable Railway.....	1	do	6,000
Lawrence Tivy.....	1	do	300
Thebaud Brothers.....	2	do	200

REFERENCES—Continued

	No.	Orders.	H. P.
United Electric Light & Power Co.....	2	Order	8,000
United Dressed Beef Co.....	1	do	500
University Building.....	1	do	600
Voss Ice Machine Works.....	1	do	200
Western Electric Co.....	2	do	1,000
Wm. Henry White.....	1	do	50
J. G. White & Co.....	12	do	15,920
Wadsworth Building.....	1	do	300
Henry R. Worthington.....	5	do	2,400
Henry Welsh.....	1	do	300
Wells & Newton Co.....	2	do	460
Western Electric Co.....	1	do	130
Westinghouse, Church, Kerr & Co.....	1	do	600
West Side Electric Light & Power Co.....	1	do	300
Richard Walter.....	1	do	160
Young & Farrell Diamond Stone Sawing Co.....	1	do	100
C. Zingling & Sons.....	1	do	160

BROOKLYN.

Adams & Son.....	1	do	5,000
Atlantic Avenue Railroad Co.....	3	do	5,000
Brown & Patterson.....	1	do	160
Bolton & Spadone.....	1	do	70
E. W. Bliss Co., Ltd.....	1	do	240
James H. Dykeman.....	1	do	160
Edison Electric Illuminating Co.....	4	do	13,800
Figge & Brother.....	1	do	100
F. Hosch.....	1	do	100
Hanan & Son.....	1	do	300
The Ironclad Manufacturing Co.....	1	do	250
John J. Lindsay & Co.....	1	do	50
McNeill Building.....	1	do	160
Nassau Electric Railroad Co.....	2	do	2,000
Niagara Steam Pump Works.....	1	do	120
New York Fur Cutting Co.....	1	do	160
Phillips, Doup & Co.....	2	do	150
Piel Brothers.....	3	do	1,000
L. M. Palmer.....	1	do	350
Rindscopt Brothers.....	1	do	130
Standard Rock Candy Co.....	1	do	100
Thomson-Houston Electric Co.....	1	do	160
J. Underwood & Co.....	1	do	70
Bellmore Pumping Station, Brooklyn City Waterworks..	1	do	160

NEW YORK STATE.

Edison Light & Power Co.....	Albany,	1	do	250
Hinckel Brewing Co.....	do	1	do	500
Amityville Electric Light Co.....	Amityville, L. I.,	1	do	160
Mohawk Mills.....	Amsterdam,	1	do	700
Ballston Terminal Railroad Co...	Ballston,	1	do	600
Soldiers' & Sailors' Home.....	Bath,	1	do	700
Bay Shore Electric Light Co.....	Bay Shore, L. I.,	1	do	110
W. F. Crane & Co.....	Bedford Station,	1	do	200
Buffalo Smelting Works.....	Black Rock,	1	do	900
J. L. Alberger & Son.....	Buffalo,	1	do	900
M. Beck Brewing Co.....	do	1	do	600
Buffalo, North Main & Tonawanda Railway.....	do	1	do	130
Buffalo Railway Co.....	do	1	do	4,000
Buffalo Engineering Co.....	do	1	do	160
E. L. Burdick Co.....	do	2	do	360

REFERENCES—Continued.

		No.	Orders.	H. P.
G. W. Francis.....	Buffalo,	1	Order	100
John T. Noye Manufacturing Co.,	do	1	do	160
Niagara Manufacturing Building,	do	1	do	160
Snow Steam Pump Works.....	do	1	do	400
Chautauqua Assembly.....	Chautauqua,	1	do	300
Flushing & College Point Street Railroad Co.....	College Point, L. I.,	2	do	360
Cortland Forging Co.....	Cortland,	1	do	70
Cortland Omnibus & Cab Co.....	do	1	do	60
Electrical Casino.....	Coney Island, L. I.,	1	do	50
Eclipse Bicycle Co.....	Elmira,	1	do	400
The Hygeia Refrigerating Co ...	do	2	do	260
West Side Street Railway Co.....	do	2	do	900
Queen's County Ice Mfg. Co.....	Far Rockaway, L. I.,	1	do	200
Citizens' Electric Lighting Co....	do	1	do	400
Green Fuel Economizer Co.....	Fishkill Landing,	1	do	60
B'klyn Water Supply Pump Station	Freeport, L. I.,	1	do	600
Henri Nestle.....	Fulton,	1	do	300
Garden City Cathedral.....	Garden City, L. I.,	1	do	200
Green Island Electric Co.	Green Island,	1	do	160
B. B. Odell.....	Haverstraw,	1	do	200
House of Refuge for Women.....	Hudson,	1	do	300
Archibald Rogers.....	Hyde Park,	1	do	50
United States Naval Station.....	Iona Island,	1	do	300
Long Island State Hospital.....	Kings Park,	1	do	200
Astoria Veneer Mills.....	Long Island City,	1	do	160
Electric Illuminating & Power Co.	do	1	do	3,000
Long Island Railroad Co.....	do	3	do	350
Spring Lake Ice Co.....	Mamaroneck,	1	do	70
B'klyn Water Supply Pump Station	Merrick, L. I.,	1	do	160
Hogan Boiler Co.....	Middletown,	1	do	200
The Howell Hinchman Co.....	do	3	do	200
H. H. Bell & Sons.....	Milton,	1	do	120
New York State Custodial Asylum	Newark,	1	do	600
Kilmer Manufacturing Co.....	Newburgh,	1	do	200
Newburgh Elec. Light & Power Co.	do	1	do	400
Newburgh Electric Railway.....	do	1	do	500
Newburgh Ice Mach. & Engine Co.	do	1	do	300
Wright Steam Engine Works.....	do	1	do	100
Delaware & Hudson Co.....	Oneonta,	1	do	1,000
American Lace Manufacturing Co.	Patchogue, L. I.,	1	do	160
Patchogue Electric Light Co.....	do	1	do	120
Poughkeepsie Electric Light Co...	Poughkeepsie,	1	do	1,000
W. S. Kimball & Co.....	Rochester,	1	do	300
Rochester Electric Light Co.....	do	1	do	400
Rochester State Hospital.....	do	1	do	600
C. W. Rockwell & Co.....	Rockwell's Mills,	1	do	100
Rome Custodial Asylum.....	Rome,	1	do	1,000
New York & Rosendale Cement Co.	Rosendale,	1	do	80
Consolidated Gas & Elec. Light Co.	Rye,	1	do	500
Fahy's Watch Case Co.....	Sag Harbor, L. I.,	1	do	300
American Locomotive Co.....	Schenectady	1	do	1,000
General Electric Co.....	do	6	do	4,400
Schenectady Locomotive Works...	do	1	do	500
Schenectady Railway Co.....	do	1	do	1,000
Bay State Shoe & Leather Co. of New York.....	Sing Sing,	1	do	70
George Bechtel Brewing Co.....	Stapleton, S. I.,	1	do	600
Jewett White Lead Works.....	Staten Island,	1	do	500
Staten Island Elec. Railroad Co...	do	2	do	2,700
Electric Light & Power Co.....	Syracuse,	1	do	3,000

REFERENCES—Continued.

		No.	Orders.	H. P.
Edward Joy.....	Syracuse,	2	Order	900
Syracuse Street Railway Co.....	do	1	do	1,600
National Hosiery Co.....	Troy,	2	do	900
Jacob F. Stoll Brewery.....	do	1	do	200
United Shirt & Collar Co.....	do	1	do	200
Buell & Son.....	Waterville,	1	do	80
James Roy & Co.....	West Troy,	2	do	400
Otis Brothers & Co.....	Yonkers,	1	do	350
Otis Elevator Co.....	do	1	do	500
Yonkers Schuyler Elec. Light Co..	do	1	do	250
ALABAMA.				
Mutual Light & Power Co.....	Montgomery,	1	do	700
Montgomery Light & Power Co..	do	1	do	1,800
Alabama Elec. Light & Power Co.	Opelika,	1	do	200
ALASKA.				
North West Light & Power Co...	Skaguay,	2	do	330
ARIZONA.				
Detroit Copper Mining Co.....	Morenci,	1	do	130
Water Works.....	do	1	do	70
ARKANSAS.				
A. Kimball.....	Arkansas City,	1	do	160
CALIFORNIA.				
Kullman, Salz & Co., Tannery....	Benicia,	1	do	160
Solano Electric Light & Gas Co..	do	1	do	70
University of California.....	Berkeley,	1	do	100
Upham & Peabody.....	Collinsville,	1	do	50
Lisbon Reclamation Dist. No. 307	Clarksburg,	2	do	320
California Portland Cement Co...	Colton,	1	do	300
Covina Irrigation Co.....	Covina,	1	do	100
Calif. & Hawaiian Sugar Ref. Co.	Crockett,	1	do	160
Fresno County Court House.....	Fresno,	1	do	80
George H. Tay Co.....	Fort Baker,	1	do	50
Swamp Land Rec. Dist. No. 556..	Isleton,	1	do	160
Seaside Water Co.....	Long Beach,	1	do	160
Conservative Life Building.....	Los Angeles,	1	do	140
Hunt's Hotel.....	do	2	do	400
Newell Brothers Bradbury Bldg..	do	1	do	290
Pacific Light & Power Co.....	do	1	do	1,800
Los Gatos Co-operative Winery...	Los Gatos,	1	do	50
Lindsay Land Co.....	Lindsay, Tulare Co.,	1	do	50
Mare Island Navy Yard.....	Mare Island,	3	do	1,400
Archie Borland.....	Mendota,	1	do	130
Roman Catholic Theological Sem.	Menlo Park,	1	do	60
Telegraph Avenue Elec. Railroad.	Oakland,	1	do	1,390
Leland Stanford Jr. University...	Palo Alto,	2	do	160
F. A. Hihn.....	Paso Robles,	1	do	100
Calif. School of Mechanical Arts..	San Francisco,	1	do	50
Chas C. Moore & Co.....	do	52	do	17,550
Cooper Med. College (Lane Hos.).	do	1	do	130
Eureka Glue Co.....	do	1	do	80
H. P. Gregory & Co.....	do	1	do	50
Independ. Elec. Light & Power Co.	do	1	do	2,400
Herbert Law.....	do	1	do	160
Merchants' Ice & Cold Storage Co.	do	1	do	300
North Shore Railroad Co.....	do	1	do	1,200
Pacific Coast Borax Co.....	do	1	do	900
Pacific Power Co.....	do	1	do	350

REFERENCES—Continued.

		No.	Orders.	H. P.
Pacific Telegraph & Telephone Co.	San Francisco,	I	Order	60
San Francisco Dry Dock Co.....	do	I	do	1,500
San Francisco Tool Co.....	do	I	do	60
Spreckel's Building.....	do	I	do	160
U. S. Appraiser's Buildings.....	do	I	do	80
Viavi Company.....	do	I	do	50
United Electric, Gas & Power Co.	Santa Barbara,	2	do	250
Santa Monica Elec. L't & Pow. Co.	Santa Monica,	I	do	200
Rough & Ready Dredging Co....	Stockton,	I	do	60
Vacaville Light & Water Co.....	Vacaville,	I	do	60
K. Casper.....	Vallejo,	I	do	200
Ventura Land & Power Co.....	Ventura,	I	do	70
C. W. Clarke	Walnut Grove,	I	do	70

COLORADO.

Colorado Springs Electric Co.....	Colorado Springs,	I	do	3,000
Colorado Springs Elec. Rail. Co..	do	I	do	300
Beggs & Tracy.....	Denver,	I	do	80
Bradley & Creighton.....	do	I	do	130
Kennedy & Pierce Machine Co....	do	I	do	120
McCarthy & Linnan.....	do	2	do	130
A. Middlebrook.....	do	I	do	50
The Mine & Smelter Supply Co....	do	I	do	200
Scott Machine & Hardware Co....	do	I	do	50
South Denver Cable Railway Co..	do	I	do	70
Antioch Mining & Mill Co.....	Leadville,	I	do	120

CONNECTICUT.

Ashcroft Manufacturing Co.....	Bridgeport,	I	do	120
Eaton, Cole & Burnham Co.....	do	2	do	550
Hartford Electric Light Co.....	Hartford,	I	do	300
Hubert Fischer's Brewery.....	do	I	do	120
Keating Wheel Co.....	Middletown,	2	do	660
Landers, Frary & Clark.....	New Britain,	I	do	600
New Britain Knitting Co.....	do	I	do	400
Russell & Erwin Manufact'g Co..	do	I	do	1,000
The Hygeia Ice Co.....	New Haven,	I	do	300
New Haven Manufacturing Co....	do	I	do	700
New Haven Rolling Mill Co.....	do	I	do	600
Fairhaven & Westville Elec. R'y..	do	I	do	1,220
Benedict & Burnham Manuf'g Co.	Waterbury,	2	do	26,00
New England Engineering Co....	do	I	do	800
Rogers & Hamilton Co.....	do	I	do	200
Waterbury Electric Railway.....	do	I	do	1,500

DELAWARE.

Benjamin F. Shaw Co.....	Wilmington,	I	do	1,800
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DISTRICT OF COLUMBIA.

Chesapeake Beach Railway Co....	Washington,	I	do	300
Georgetown & Tenallyt'n R. R. Co.	do	I	do	250
Metropolitan Railroad Co.....	do	3	do	2,500
James Miller.....	do	I	do	50
United States Navy Yard.....	do	I	do	500
Washington Navy Yard.....	do	I	do	400
Wash. Br'y Co., Mt. Vernon Brew'y	do	I	do	300
Woodward & Lothrop.....	do	I	do	160

FLORIDA.

Palmetto Phosphate Co.....	Meinenger,	I	do	300
Orange City Water Works.....	Orange City,	I	do	60
The Goulding Fertilizer Co.....	Pensacola,	I	do	130

REFERENCES - Continued.

Plant Investment Co.....	Port Tampa,	No. 1	Orders. Order	H. P. 50
Titusville Electric Light Co.....	Titusville,	1	do	50
GEORGIA.				
Aragon Mills.....	Aragon,	1	do	600
Cedartown Water Works.....	Cedartown,	1	do	80
De La Vergne Renfing Mach. Co.	Savannah,	1	do	400
Hammond, Hull & Co.....	do	1	do	200
Valdosta Water Works.....	Valdosta,	1	do	80
ILLINOIS.				
Urbana & Champaign El. St. Ry. Co.	Champaign,	1	do	600
Commonwealth Electric Co.....	Chicago,	2	do	1,700
Fraser & Chalmers.....	do	2	do	210
W. W. Nugent.....	do	1	do	160
New York Safety Steam Power Co.	do	3	do	630
Northwestern Elec. Lt. & Pow. Co.	do	1	do	500
L. H. Prentice Co.....	do	1	do	700
Riemer, La Bahn & Kuester.....	do	1	do	160
E. St. Louis Ice & Cold Storage Co.	East St. Louis,	2	do	900
Elmhurst Spring Water Co.....	Elmhurst,	1	do	50
C. H. Widmayer & Son.....	Jacksonville,	1	do	50
Union Stock Yards & Dist. Co....	Peoria,	1	do	80
A. L. Ide & Son.....	Springfield,	1	do	80
INDIANA.				
Indiana Cotton Mills.....	Cannelton,	1	do	600
Indianapolis Gas Co.....	Cicero,	1	do	1,600
Logansport & Wabash Val. Gas Co.	do	1	do	300
Vienna Enamel & Stamp Co.....	Chesterton,	1	do	80
Grote Manufacturing Co.....	Evansville,	1	do	300
Southern Hospital for Insane.....	do	1	do	300
D. A. Bohlen & Son.....	Indianapolis,	1	do	300
William E. English.....	do	1	do	300
Thompson-Houston Electric Co....	Rensselaer,	1	do	100
Sandusky Portland Cement Co....	Syracuse,	1	do	80
IOWA.				
Meek Brothers.....	Bonaparte,	1	do	200
Ottumwa Ry. Electric & Steam Co.	Ottumwa,	1	do	350
Villisca Electric Co.....	Villisca,	1	do	130
What-Cheer Elec. Lt. & Power Co.	What Cheer,	1	do	50
KANSAS.				
Soldiers' Orphan Home.....	Atchison,	1	do	300
Military Prison.....	Ft. Leavenworth,	1	do	160
Hays City Milling Co.....	Hays City,	1	do	70
H. D. Towner.....	do	1	do	50
Herington El. Lt. & Water Wks. Co.	Herington,	1	do	120
Holton Electric Light & Power Co.	Holton,	1	do	120
Iola Carriage & Omnibus Co.....	Iola,	1	do	50
Lawrence Gas, Fuel & El. Lt. Co.	Lawrence,	1	do	160
Manhattan Electric Light Co.....	Manhattan,	1	do	70
Marysville Electric Light Co.....	Marysville,	1	do	50
Norton Electric Light Co.....	Norton,	1	do	50
Parsons Electric Light Co.....	Parsons,	1	do	160
Winfield Electric Light Co.....	Winfield,	1	do	80
KENTUCKY.				
Ashland Water Supply Co.....	Ashland,	1	do	130
Blue Grass Cordage Co.....	Georgetown,	1	do	200
John Finzer & Brothers.....	Louisville,	1	do	500

REFERENCES—Continued.

		No.	Orders.	H. P.
Louisville Cold Storage Co.....	Louisville,	1	Order	160
Mellwood Distillery Co.....	do	1	do	240
Herman Meth.....	do	1	do	240
Old Kentucky Woolen Mills.....	do	1	do	500
Southern Engineering Co.....	do	1	do	240
Tarascon Woolen Mill Co.....	do	1	do	240
Owensboro Ice Manufacturing Co.	Owensboro,	1	do	120
The People's Crystal Ice Manuf'y.	Paducah,	1	do	130
LOUISIANA.				
Jenning's Elec. Light & Power Co.	Jennings,	1	do	240
Edison Electric Co.....	New Orleans,	1	do	2,000
The W. R. Irby Cigar & Tobac. Co.	do	1	do	120
Jackson Brewing Co.....	do	1	do	200
McDonald & Hart.....	do	1	do	500
A. M. Lockett & Co.....	do	3	00	1,440
National Contracting Co.....	do	1	do	350
MAINE.				
S. D. Warren & Co.....	Cumberland Mills,	1	do	900
Portland Railroad Co.....	Portland,	4	do	1,840
Rockland Building Association...	Rockland,	1	do	100
Rockland, Thomaston & Camden St. Railway Co.....	do	1	do	240
MARYLAND.				
Baltimore Electric Refining Co...	Baltimore,	1	do	2,000
Baltimore, Middle River and Spar- rows Point Railway Co.....	do	1	do	500
Cumberland, Dugan & Co.....	do	1	do	100
Edison Electric Illuminating Co..	do	2	do	2,700
Maryland Manufact. & Con. Co...	do	1	do	500
Principio Forge Co.....	Principio Station,	1	do	240
MASSACHUSETTS.				
Aldine Light, Heat & Power Co..	Boston,	1	do	160
A. E. Appleyard.....	do	3	do	5,100
Autchmuty Building.....	do	1	do	100
W. F. Badger.....	do	1	do	200
Baeder, Adamson & Co.....	do	1	do	400
George F. Blake Manufact. Co....	do	1	do	100
F. G. Coughlan & Co.....	do	1	do	50
Eastern Cold Storage Co.....	do	1	do	240
Edison Electric Illuminating Co..	do	3	do	18,400
Elect. Association Incorporated..	do	1	do	1,500
George S. Hutchings.....	do	1	do	100
Alfred A. Hunting.....	do	1	do	70
Paine Furniture Co.....	do	1	do	200
Paul Steam System Co.....	do	1	do	60
Quincy Market Cold Storage Co..	do	1	do	500
A. T. Stearns Lumber Co.....	do	1	do	300
Swift Brothers & Co.....	do	2	do	430
Standard Cordage Co.....	do	1	do	600
William Underwood.....	do	1	do	80
R. H. White & Co.....	do	1	do	250
Walworth Con. & Supply Co.....	do	2	do	750
Brookline Gas Light Co.....	Brookline,	1	do	750
Cambridge Electric Light Co.....	Cambridge,	1	do	190
Cambridge Diary Co.....	do	1	do	60
Harvard University.....	do	1	do	100
Edw. Kendall & Sons.....	do	1	do	50
Roberts Iron Works.....	do	1	do	80

REFERENCES—Continued.

		No.	Orders.	H. P.
D. M. Hazen & Co.....	Campbello,	1	Order	50
Boston Navy Yard.....	Charleston,	1	do	900
Syndicate Brewing Co.....	East Somerville,	1	do	500
Cochrane Chemical Co.....	Everett,	1	do	500
Narragansett Mills.....	Fall River,	1	do	1,000
Edison Electric Illuminating Co..	do	1	do	400
Florence Manufacturing Co.....	Florence,	1	do	130
Hollingsworth & Vose.....	Hyde Park,	1	do	500
Ipswich Mills.....	Ipswich,	1	do	350
V. K. & A. H. Jones.....	Lynn,	1	do	80
Tileston & Hollingsworth Co.....	Mattapan,	3	do	1,100
Malden Electric Co.....	Malden,	2	do	1,400
Wadsworth, Howland & Co.....	do	1	do	120
Chilson Furnace Co.....	Mansfield,	1	do	80
A. M. Smith.....	W. Medway,	1	do	70
Hathaway Manufacturing Co.....	New Bedford,	1	do	1,200
Bowker & Tripp.....	do	1	do	60
City Manufacturing Co.....	do	1	do	1,000
Standard Building.....	do	1	do	60
Wamsutta Mills.....	do	1	do	1,600
Whitefield Mills.....	Newburyport,	1	do	240
Paul Whitin Manufacturing Co., Rockdale Mills.....	Northbridge,	1	do	300
Florence Manufacturing Co.....	Northampton,	1	do	60
Berkshire Street Railway Co.....	Pittsfield,	1	do	2,000
Naumkeag Steam Cotton Co.....	Salem,	1	do	600
Williams, Kneeland & Co.....	South Braintree,	1	do	100
Newton Street Railway Co.....	Waltham,	1	do	800
Waltham Gas Light Co.....	do	1	do	800
Hollingsworth & Vose.....	East Walpole,	1	do	200
George H. Gilbert Manuf ing Co..	Ware,	1	do	500
Westport Manufacturing Co.....	Westport,	1	do	120
Whitin Machine Co.....	Whitinsville,	1	do	500
Worcester Electric Railway.....	Worcester,	1	do	500

MICHIGAN.

Detroit Elect. Light & Power Co..	Detroit,	1	do	1,000
Michigan Brass & Iron Works....	do	1	do	130
Alabastine Co.....	Grand Rapids,	1	do	160
Consolidated Street Railway Co..	do	1	do	70
Fox Machine Co.....	do	2	do	180
Goshen Sweeper Co.....	do	1	do	100
Harrison Wagon Works.....	do	1	do	200
Hart Plate Mirror Co.....	do	1	do	100
O. & W. Thum Co.....	do	1	do	80
Valley City St. & Cable Ry. Co..	do	2	do	1,200
Widdicomb Furniture Co.....	Hancock,	1	do	100
Hancock Water Works.....	do	1	do	60
Negaunee & Ishpeming St. Ry. & Electric Co.....	Negaunee,	1	do	350
Toledo & Monroe Const. Co., Ltd.	Monroe,	3	do	3,400
Diamond Match Co.....	Ontonagon,	2	do	600
Ontonagon Water Works.....	do	1	do	160
Detroit & Lake Orion Railway Co.	Rochester,	4	do	2,500
Detroit United Railway.....	do	2	do	1,600
St. Marie's Falls Canal.....	Saulte St. Marie,	1	do	1,000
J. B. Ford & Co.....	Wyandotte,	1	do	1,000

MINNESOTA.

J. D. Hardebeck.....	Alexandria,	1	do	70
Chamber of Commerce.....	Duluth,	1	do	70

REFERENCES—Continued.

		No.	Orders.	H. P.
Duluth Elect. Light & Power Co..	Duluth,	1	Order	400
Faribault Electric Light Co.....	Faribault,	1	do	70
Schwearingen Co.....	Fairmont,	1	do	50
Hutchinson Water Works.....	Hutchinson,	1	do	80
Woodward & Son.....	Langdon,	1	do	50
Chamber of Commerce.....	Minneapolis,	1	do	50
Douglas Linseed Oil Mill.....	do	1	do	160
Enterprise Machine Co.....	do	1	do	200
W. H. Eustis.....	do	1	do	400
The Interstate Grain Co.....	do	1	do	100
The Link Belt Supply Co.....	do	1	do	160
Minneapolis Box Co.....	do	1	do	80
Post Office.....	do	1	do	50
Thomson-Houston Electric Co....	do	1	do	250
New Ulm Electric Light Co.....	New Ulm,	1	do	160
B. Beaupre.....	St. Paul	1	do	80
Fairbanks, Morse & Co.....	do	1	do	200
St. Paul City Railway Co.....	do	1	do	1,000
J. S. Stephens.....	do	1	do	50
Tracy Water Works.....	Tracy,	1	do	70
Duluth & Iron Range Railroad Co.	Two Harbors,	1	do	200
Water Works.....	Windom,	1	do	80

MISSOURI.

Brookfield Electric Light Co.....	Brookfield,	1	do	160
Atlas Portland Cement Co.....	Hannibal,	2	do	4,000
Consolidated Tank Line Co.....	Kansas City,	1	do	50
English Supply & Engine Co.....	do	1	do	100
Hall Office Building.....	do	1	do	300
The Journal Co.....	do	1	do	160
Missouri Chemical Manufac'g Co..	do	1	do	80
New England Building.....	do	1	do	50
Seddon & Edwards Brick Co.....	do	1	do	60
K. C. Switch & Bros. Co.....	do	1	do	70
Woolf Brothers.....	do	2	do	130
Woolf Brothers' Laundry.....	do	1	do	320
Whitcomb Cabinet Co.....	do	1	do	70
Corbin & Son.....	Liberty,	1	do	50
American Ice Machine Co.....	St. Louis,	1	do	80
Heine Safety Boiler Co.....	do	2	do	860
Imperial Elec. Lt., Heat & Pow. Co.	do	1	do	3,500
S. N. Long Syrup Co.....	do	1	do	240
The Ranken & Fritsch Foundry and Machine Co.....	do	1	do	100
St. Louis Brewing Association....	do	1	do	300
St. Louis & Suburban St. R. R. Co.	do	1	do	2,400
St. Louis Dairy Co.....	do	1	do	100
Waters Pierce Oil Co.....	do	1	do	240
Rankin & Wolf.....	Tarkio,	1	do	160

MONTANA.

Citizens' Electric Light Co.....	Helena,	2	do	130
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NEW HAMPSHIRE.

Mount Pleasant Hotel Co.....	Mt. Pleasant,	1	do	500
Portsmouth Navy Yard.....	Portsmouth,	1	do	500

NEW JERSEY.

Atlantic Coast Elec. Railroad Co..	Allenhurst,	1	do	700
Burlington Elec. Light & Pow. Co.	Burlington,	1	do	400
Camden & Suburban Railway Co.	Camden,	3	do	4,500
West Jersey Ice Manufacturing Co.	do	2	do	430

REFERENCES—Continued.

		No.	Orders.	H. P.
Liebig Manufacturing Co.....	Cartaret,	1	Order	300
Dover, Rockaw'y & Pt. Oram G's Co.	Dover,	1	do	50
Singer Manufacturing Co.....	Elizabethport,	3	do	4,460
Samuel L. Moore & Sons Co.....	do	1	do	300
N. J. & Hudson R. Ry. & Ferry Co..	Edgewater,	1	do	700
Bergen County Traction Co.....	Fort Lee,	2	do	700
New Jersey Zinc Co.....	Franklin,	3	do	2,700
Penna. R. R. Co., for Hoboken shops	Hoboken,	1	do	600
do ferry boat "New Jersey"	do	1	do	600
do ferry boat "Baltimore".	do	1	do	600
Consolidated Traction Co.....	Jersey City,	1	do	1,500
Columbia Rolling Mill Co.....	do	1	do	160
P. Lorillard Co.....	do	3	do	1,230
F. O. Matthiessen.....	do	1	do	100
Spaulding & Jennings Co.....	do	4	do	3,800
Lakewood Hotel.....	Lakewood,	1	do	350
Middlesex & Monmouth Light, Heat & Power Co.....	Matawan,	1	do	240
Henry Maurer & Co.....	Maurer,	1	do	250
Brunswick Traction Co.....	Milltown,	2	do	1,000
Pennsylvania R. R. Co.....	Mount Holly,	1	do	600
Benjamin Atha & Illingworth Co..	Newark,	1	do	100
Henry E. Bailey.....	do	1	do	70
The Celluloid Co.....	do	1	do	3,000
Central Power Co.....	do	1	do	500
Consolidated Traction Co.....	do	1	do	600
J. W. Deckert & Co.....	do	1	do	80
John Fergg's Brewery.....	do	1	do	130
Harvey Steel Co.....	do	1	do	500
Hay Foundry & Iron Works.....	do	1	do	70
Hewes & Phillips Iron Works.....	do	4	do	1,160
J. W. Hyatt.....	do	1	do	50
Krueger Hygiene Ice Co.....	do	1	do	1,000
New Jersey Freie Zeitung.....	do	1	do	50
People's Light & Power Co.....	do	1	do	3,000
Edward Zusi.....	do	1	do	50
Howard V. Butler.....	New Brunswick,	1	do	160
Dundee Water Power & Land Co.	Passaic,	1	do	130
Passaic Lighting Co.....	do	1	do	800
John E. Beggs.....	Paterson,	1	do	120
Cooke Locomotive & Mach. Works	do	2	do	800
Kearney & Foote Co.....	do	1	do	400
Guggenheim Smelting Co.....	Perth Amboy,	1	do	1,200
Standard Underground Cable Co..	do	1	do	200
Andover Iron Co.....	Rockaway,	1	do	350
E. Blunt Manufacturing Co.....	Roseville,	1	do	50
New Jersey Electric Railway Co..	Secaucus,	1	do	1,000
Weston Electrical Instrument Co..	Waverly,	2	do	400
McEwen Brothers Co.....	Whippany,	1	do	350

NEW MEXICO.

Santa Fe Water & Light Co.....	Santa Fe,	1	do	240
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NORTH CAROLINA.

Proximity Manufacturing Co.....	Greensboro,	1	do	1,000
Gastonia Cotton Manufact'g Co...	Gastonia,	1	do	200
Keystone Mining & Mfg. Co.....	Lexington,	1	do	100
Gastonia Manufacturing Co.....	Lowell,	1	do	160
Salisbury Gas & Electric Co.....	Salisbury,	1	do	160
Wilmington Street Railway Co....	Wilmington,	1	do	300
Winston Electric Railway Co.....	Winston,	1	do	300

REFERENCES—Continued.

OHIO		No.	Orders.	H. P.
			Order	
Bellevue Light & Power Co.....	Bellevue,	1		160
Bellaire Nail Works.....	Bellaire,	1	do	500
Wrought Iron Bridge Co.....	Canton.	1	do	160
Boughen Engineering Co.....	Cincinnati,	1	do	200
The Foulds Milling Co.....	do	1	do	240
J. K. Rugg & Co.....	do	1	do	240
Bishop & Babcock Co.....	Cleveland,	1	do	500
Brooklyn Street Railway Co.....	do	3	do	1,600
Brown Hoisting Machinery Co....	do	1	do	500
Caxton Building Co.....	do	1	do	600
Chafer & Becker.....	do	1	do	200
Cleveland Cap Screw Co.....	do	1	do	700
Cleveland City Railway Co.....	do	1	do	3,000
Cleveland Electric Railway Co...	do	2	do	9,000
Cleveland Twist Drill Co.....	do	1	do	500
Extension Cedar Av. Pow. House.	do	1	do	3,000
Hill Clutch Co.....	do	1	do	400
George S. Rider.....	do	1	do	600
Rouse Block.....	do	1	do	200
The Rouse & Hills Co.....	do	1	do	200
Standard Sewing Machine Co.....	do	1	do	500
Western Mineral Wool Co.....	do	1	do	60
Ohio State University.....	Columbus,	1	do	800
Dayton, Springfield & Urbana				
Electric Railway Co.....	Donnellsville,	2	do	1,900
Hamilton Electric Light Co.....	Hamilton,	1	do	500
Niles Tool Works Co.....	do	1	do	1,000
Columbus, Buckeye Lake & New-				
ark Street Railway Co.....	Hebron,	1	do	1,600
Hillsboro Water Works.....	Hillsboro,	1	do	160
Aultman-Taylor Manufactur'g Co.	Mansfield,	1	do	200
Russell & Co.....	Massilon,	2	do	320
Columbus, London & Springfield				
Street Railway Co.....	Medway,	1	do	1,600
Junction Iron & Steel Co.....	Mingo Junction,	1	do	1,000
Mingo Junction Water Co.....	do	1	do	80
Howe Electric Construction Co...	Norwalk,	1	do	160
Buckeye Engine Co.....	Salem,	1	do	60
American Crayon Co.....	Sandusky,	1	do	700
James Leffel & Co.....	Springfield,	1	do	60
Gill Brothers & Co.....	Steubenville,	1	do	100
Toledo Furnace Co.....	Toledo.	1	do	3,500
Wellsville Electric Light Co.....	Wellsville,	1	do	400
Bessemer Limestone Co.....	Youngstown,	1	do	160
The Globe Manufacturing Co.....	do	1	do	200
Mahoning Rubber Manufact'g Co.	do	1	do	1,000
Morris Hardware Co.....	do	1	do	240
Ohio Steel Co.....	do	1	do	2,400
Youngstown Bridge Co.....	do	1	do	240
Youngstown City Water Works...	do	1	do	100
OREGON.				
Cons. Bonanza Gold Mines Co....	Geiser,	1	do	400
Morris & Whitehead.....	Portland,	1	do	600
PENNSYLVANIA.				
Charleroi Water Works.....	Allegheny City,	1	do	240
Clark Brothers.....	do	1	do	60
De Haven Stove & Foundry Co...	do	1	do	60
Julius De Long & Co.....	do	1	do	100

REFERENCES—Continued.

		No.	Orders.	H. P.
Department of Public Works.....	do	1	Order	1,000
D. Lutz & Sons' Brewing Co.....	do	2	do	950
Eberhardt & Ober Brewing Co....	do	1	do	800
J. C. Lappe Tanning Co.....	do	1	do	300
Palace Coliseum Theater.....	do	1	do	100
Pittsburgh Locom. & Car Works..	do	1	do	1,000
Pittsburgh Valve & Machine Co..	do	1	do	240
Western Penitentiary of Penn....	do	1	do	160
Allegheny City Elec. Light Plant.	do	2	do	1,600
Allegheny City Water Works.....	do	1	do	600
Fried & Reineman.....	do	2	do	460
Montrose Pumping Co.....	do	1	do	600
Blairsville Rolling Mill & Tin Plate Co	Blairsville,	1	do	500
Chandley Brothers & Co.....	Beaver Falls,	1	do	130
Braddock Electric Railway Co....	Braddock,	1	do	300
Bradford Elec. Light & Power Co.	Bradford,	1	do	300
W. H. Grundy & Co.....	Bristol,	1	do	200
The Bryden Horseshoe Co.....	Catasauqua,	2	do	500
Herman Kostenbader.....	Lower Catasauqua,	1	do	50
Southwestern State Normal School	California,	1	do	60
Manufacturers' Natural Gas Co...	Cannonsburg,	1	do	500
Delaware River Iron Ship Building and Engine Works.....	Chester,	1	do	400
John M. Sharpless & Co., Riverside Mills.....	do	1	do	500
Coatesville Boiler Works, Inc.....	Coatesville,	1	do	300
Connellsville Brewing Co.....	Connellsville,	1	do	350
J. Elwood Lee Co.....	Conshohocken,	1	do	50
Borough Water Works.....	Coraopolis,	1	do	160
Chandley Brothers & Co.....	do	1	do	160
Ellwood Steel Co	Ellwood City,	1	do	500
Ball Engine Co.....	Erie,	3	do	450
Erie City Iron Works.....	do	1	do	100
Pennsylvania Boiler Works.....	do	1	do	500
Valley Electric Co.....	Fallston,	1	do	800
Roman Catholic Protectory.....	Flatland, Montgom- ery Co.,	1	do	240
Pittsburgh Plate Glass Co.....	Ford City,	1	do	1,000
John Fritsch Globe Brewery.....	Frankfort,	1	do	50
John Bardsley & Co.....	Germantown,	1	do	250
Ice Mfg. Co. of Germantown.....	do	1	do	160
Connellsville Water Co.....	Gibson Station,	1	do	160
Des Moines Edison Light Co.....	Harrisburg,	1	do	400
N. J. Zinc Co.....	Hazard. Carbon Co.,	3	do	4,400
Homestead Water Works.....	Homestead,	1	do	240
Oakmont & Verona Electric Heat, Light & Power Co.....	Hulton,	1	do	240
Huron Water Co.....	Huron Station, Fay- ette Co.,	1	do	500
National Brewing Co.....	Jeanette,	1	do	200
New York & Pennsylvania Co....	Johnsonburg,	2	do	5,400
C. B. Grubb & Son.....	Lancaster,	1	do	250
Phila. & West Chester Traction Co.	Llanerch,	2	do	1,200
George Altmeyer.....	McKeesport,	1	do	160
Pittsburgh & Lake Erie Railroad..	McKees Rocks.	1	do	1,000
Pressed Steel Car Co.....	do	1	do	200
The Ella Coal Co.....	Milesville,	1	do	80
Mt. Pleasant Brewing Department.	Mt. Pleasant,	1	do	400
Mt. Pleasant Water Co.....	Mullen Station, West- moreland Co.,	1	do	300

REFERENCES—Continued.

		No.	Orders.	H. P.
Atlas Portland Cement Co.....	Northampton,	1	Order	5,000
The American Pipe Mfg. Co.....	Philadelphia,	1	do	80
The William Annear Co.....	do	1	do	100
Barnes-Erb Laundry Co.....	do	2	do	180
Croft & Allen Co.....	do	1	do	250
Eastern Eng. & Construction Co..	do	1	do	240
Electric Traction Co.....	do	1	do	1,200
S. Faith & Co.....	do	1	do	600
The Fidelity Mutual Life Association Building.....	do	1	do	600
Garrick Theater.....	do	1	do	300
Gray & Son.....	do	1	do	160
Harrison Stores, 10th & Filbert Sts.	do	1	do	500
Andrew H. Haig.....	do	1	do	50
Kelsey Oriental Bath Co.....	do	1	do	250
Onderdonk Heat. & Ventilating Co.	do	2	do	1,100
Pennsylvania Iron Works Co.....	do	2	do	13,000
The J. B. Rodgers Printing Co....	do	1	do	70
Thackara Manufacturing Co.....	do	1	do	120
Walton Hotel.....	do	1	do	600
Schuylkill Valley Illuminating Co.	Phoenixville,	1	do	240
Armstrong Cork Co.....	Pittsburgh,	3	do	1,400
Armstrong Brothers & Co.....	do	2	do	740
American Water Works & Gas Co.	do	1	do	160
Consolidated Traction Co.....	do	1	do	4,000
Crystal Water Co.....	do	1	do	240
F. R. Dravo & Co.....	do	1	do	100
Harbison & Walker.....	do	3	do	810
Keystone Mining & Mfg. Co.....	do	1	do	100
Kirschler & Tooker.....	do	1	do	350
Leader Publishing Co.....	do	1	do	80
Lustre Mining Co.....	do	1	do	200
McConway & Torley Co.....	do	1	do	300
Thomas L. Pfarr, Jr.....	do	1	do	200
Pittsburgh Brewing Co.....	do	2	do	2,400
Pittsburgh & L. Erie R. R. Termin.	do	1	do	700
Edw. E. Rieck Co.....	do	1	do	300
William Schuette & Co.....	do	1	do	160
Taylor, Wilson & Co.....	do	1	do	70
Wainwright Brewing Co.....	do	1	do	130
Westinghouse, Church, Kerr & Co.	do	2	do	1,000
Wilson-Snyder Mfg. Co.....	do	4	do	1,170
Emil Winters.....	do	1	do	100
Rochester Electric Co.....	Rochester,	1	do	160
Scranton Traction Co.....	Scranton,	1	do	800
Street Railway Construction Co. of New Jersey.....	do	1	do	400
People's Electric Railway.....	do	1	do	400
Sharpsburg Water Co.....	Sharpsburg,	1	do	350
Sunbury & Northumberland Electric Railway Co.....	Sunbury,	1	do	500
Pittsburgh Brewing Co.....	Uniontown,	1	do	400
United Light Co.....	do	1	do	300
Suburban Water Co.....	Verona,	1	do	60
George Duncan, Sons & Co.....	Washington,	1	do	50
Railway Spring & Manufact. Co..	do	1	do	160
Tyler Tube & Pipe Co.....	do	2	do	430
Wheeling Natural Gas Co.....	do	1	do	500
Frick Co.....	Waynesboro,	13	do	2,470
West Point Manufact. Co., Ltd...	West Point,	1	do	300
E. Keeler Co.....	Williamsport,	1	do	100

REFERENCES—Continued.

Lycoming Electric Co.....	Williamsport,	No. 2	Order	H. P.
Williamsport Wire Rope Co.....	do	1	do	1,200
Woodland Fire Brick Co., Ltd....	Woodland, Clear-	1	do	100
	field Co.,	1	do	200
Iron City Sanitary Manufact. Co.,	Zelienople,	2	do	460

RHODE ISLAND.

The Hebron Co.....	Hebronville,	1	do	800
Lonsdale Co., No. 4 Mill.....	Lonsdale,	1	do	1,000
Lorraine Mfg. Co.....	Pawtucket,	1	do	800
J. P. Campbell & Co.....	Providence,	1	do	300
Corliss Steam Engine Co.....	do	16	do	8,590
Providence Cable Tram Co.....	do	1	do	300
Vesta Knitting Mills.....	do	1	do	300
Hope Webbing Co.....	Woodland,	1	do	130

SOUTH CAROLINA.

Charleston Lead Works.....	Charleston,	1	do	50
Charleston Street Railway Co.....	do	1	do	1,200
Palmetto Brewing Co.....	do	2	do	480
The So. Carolina & Georgia R. R.	do	1	do	50
Valk & Murdock Iron Works.....	do	5	do	390
Darlington, Ginning, Milling, F. & W. Co.....	Darlington,	1	do	160
Georgia Chemical Works.....	Pon Pon,	1	do	80

SOUTH DAKOTA.

Curtis & Hungerford.....	Aberdeen,	1	do	120
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TENNESSEE.

Chattanooga Light & Power Co....	Chattanooga,	1	do	800
James & Co.....	do	1	do	80
Jonesboro Cotton Mills.....	Jonesboro,	1	do	130
Knoxville Furniture Co.....	Knoxville,	1	do	100
Knoxville Woolen Mills.....	do	1	do	300
Wendell Ruof.....	do	5	do	960
Marysville Woolen Mills.....	Marysville,	1	do	130

TEXAS.

Dallas Electric Light & Power Co.	Dallas,	3	do	2,200
Ft. Worth & Arlington Heights				
Street Railway Co.....	Ft. Worth,	1	do	300
Southern Pacific Co.....	Galveston Docks,	1	do	400
Southern Pacific Terminal Co.....	Galveston,	1	do	800
Citizens' Elec. Light & Power Co..	Houston,	4	do	3,200
Omaha & South'n Texas Land Co.	do	1	do	100
Wm. M. Rice.....	do	1	do	300
San Antonio Brewing Association.	San Antonio,	1	do	300

VERMONT.

Simpson & Robinson.....	Richford,	1	do	200
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VIRGINIA.

Virgiria Portland Cement Co.....	Craigsville,	2	do	1,700
Hygeia Hotel.....	Fortress Monroe,	2	do	160
Huntingdon Industrial Works....	Hampton,	1	do	600
Washington, Alexandria & Mt. Ver-				
non Electric Railway Co.....	Mt. Vernon,	1	do	800
Norfolk Navy Yard.....	Norfolk,	3	do	1,850
Frictionless Metal Co.....	Richmond,	1	do	80
Emil Kersten Brewery.....	do	1	do	160
Richmond Loco. & Mach. Works..	do	1	do	120

REFERENCES—Continued.

		No.	Orders.	H. P.
Staunton Milling Co.....	Staunton,	1	Order	100
Wm. Foster.....	Vesuvius,	1	do	300
Town Council.....	Wytheville,	1	do	50

WASHINGTON.

Puget Sound Reduction Co.....	Everett,	1	do	300
Atlas Lumber & Shingle Co.....	McMurray,	1	do	130
Seattle Electric Co.....	Seattle,	3	do	9,700
W. L. Bretherton.....	Tacoma,	1	do	100
J. R. Harvey.....	Vancouver,	1	do	240

WEST VIRGINIA.

Graham Bluefield Electric Light & Power Co.....	Bluefield,	1	do	300
United States Leather Co.....	Davies,	1	do	500
Mellon Pipe Lines.....	Littleton,	1	do	240
Mellon Pipe Lines.....	Sisterville,	1	do	240
Lewis & Hazlett.....	Wheeling,	1	do	1,000
Whitaker Iron Co.....	do	3	do	2,100

WISCONSIN.

Doherty Lumber Co.....	Ashland,	1	do	160
Water Works.....	Cumberland,	1	do	60
Centralia Water Works.....	Centralia,	1	do	60
Helms Manufacturing Co.....	Milwaukee,	1	do	80
Milwaukee Elec. Ry. & Lt. Co....	do	1	do	3,500
Oshkosh Gas Light Co.....	Oshkosh,	1	do	100
Rice Lake Water Works Co.....	Rice Lake,	1	do	80
River Falls Water Works.....	River Falls,	1	do	60
American Steel Barge Co.....	West Superior,	2	do	230
Douglas Co. Street Railway Co...	do	1	do	500
S. T. Norvell.....	do	1	do	500

CANADA.

John Bonar.....	Belleville,	1	do	50
Black Lake Mine.....	Capleton,	1	do	80
George A. Walkem.....	Liverpool, B. C.,	1	do	320
British Columbia Elec. Ry. Co....	Vancouver, B. C.,	1	do	900
Dominion Coal Co., Ltd.....	Glance Bay, C. B.,	3	do	3,400
Dominion Coal Co.....	Sydney, C. B.,	1	do	2,400
St. John Railway Co.....	St. John, N. B.,	2	do	3,500
Halifax Electric Tramway Co....	Halifax, N. S.,	1	do	1,200
Inter-Colonial Coal Mining Co....	Westville, N. S.,	1	do	500
Bell Telephone Building.....	Montreal, P. Q.,	1	do	350
Deaf & Dumb Institute.....	do	2	do	120
Garth & Company.....	do	1	do	350
A. Holden & Co.....	do	1	do	70
Hospice St. Vincent de Paul.....	do	2	do	140
Ingersoll-Sargeant Drill Co.....	do	1	do	170
McGill University.....	do	1	do	240
Montreal Street Railway Co.....	do	1	do	2,000
Henry Morgan & Co.....	do	1	do	130
Royal Electric Co.....	do	1	do	200
A. H. Sims & Co.....	do	1	do	300
Steamer Columbian, Richelieu & Ontario Navigation Co.....	do	1	do	400

FOREIGN.

Deep Leads El. Transmission Co.	Melbourne, Austral.	1	do	1,200
H. P. Gregory.....	Sydney, N. S. W., do	3	do	270
Sydney Tramways.....	do do	1	do	10,000
China Light & Power Co.....	Hong Kong, China,	1	do	240

REFERENCES—Continued.

		No.	Orders,	H. P.
		1	Order	
British Henrici Laundry Mach. Co.	London, E.C., Eng.,	1		600
British Westinghouse Electric & Manufacturing Co., Limited...	Manchester, Eng.,	1	do	1,800
* Fred Stieltjes & Co.....	Amsterdam, Holl'd,	1	do	50
Hilo Electric Power & Refrig. Co.	Hilo, H. I.,	1	do	160
Castle & Cook, Limited.....	Honolulu, H. I.,	1	do	100
Hawaiian Automobile Co.....	do	1	do	100
Honolulu Rapid Tran. & Land Co.	do	1	do	700
Kyoto Electric Light & Power Co.	Kyoto, Japan,	1	do	300
Nagoya Electric Light Co.....	Nagoya, Japan,	4	do	1,120
Nagoya Ice Co.....	do	1	do	70
Government Arsenal.....	Tokyo, Japan,	2	do	740
Government Military Department.	do	1	do	50
Yokohama United Club.....	Yokohama, Japan,	1	do	70
Hokkaido Tanko Railway.....	———, Japan,	1	do	1,200
Electric Light Co.....	Cuernavaca, Mex.,	1	do	50
Juan Pagaza.....	do	1	do	50
La Casa Vida de Portillo.....	Leon-Guanajuato,			
	Mexico,	1	do	160
Heriberto F. Carter.....	Guanajuato, Mex.,	1	do	50
Providencia Mining Co.....	Dolores Hidalgo Es-			
	tado de Guanaj-			
	uato, Mexico,	1	do	50
J. Rendon & Bros.....	Merida, Yucatan, Mex.	1	do	80
Senores E Escalante E Hijo.....	do	do 2	do	200
J. Arce & Co.....	Mexico, Mexico,	1	do	50
G. & O. Braniff & Co.....	do	1	do	100
Departamento de Construcción Del				
Ferro Carril.....	do	1	do	240
F. M. De Prex Y Cia.....	do	1	do	200
Velazquez Gayol & Co.....	do	1	do	70
El Oro Mining Co.....	S'te. of Durango, Mex.,	1	do	200
Beistegui Y Carmona.....	San Vincente Morelos,			
	Mexico.,	1	do	200
Kelburne & Karori Tram. Co., Ltd.	Wellington, N. Zeal.,	1	do	60
E. M. Barretto.....	Manila, Philippine Is.,	2	do	100
P. Roxas.....	do	1	do	50
Philippine Com. & Dev. Co.....	do	1	do	200
Sheriff, Swingley & Co., Ltd.....	Johannesburg, S. Af.,	1	do	500
A. S. Plews.....	Georgetown, Br. Ga.,	1	do	320
Manaos Railway Co.....	Manaos, Brazil, S. A.,	1	do	800
Muller & De Jong Surinam.....	Paramaribo, D. Gui-			
	ana, S. A.,	1	do	160
Surinam Hydraulic Co.....	do do	1	do	400
A. S. Plews.....	Kingston, Jamaica,			
	W. I.,	1	do	160
Rafael Estrada.....	Matanzas, Cuba, W. I.,	1	do	800
Spanish-American Lt. & Pow. Co.	Havana, Cuba, W. I.,	2	do	440
Joaquin Ramos.....	do	1	do	300
A. S. Plews.....	Trinidad, B. W. I.,	1	do	320
Trinidad Asphalt Co.....	Point Boyer, Trinidad,			
	W. I.,	1	do	60
United Fruit Co.....	Port Antonio, Jamaica,			
	B. W. I.,	1	do	130
Usine a Glace.....	Port au Prince, Hayti,	1	do	160
Cia Huanchaca De Bolivia.....	Antofagasta, Chile,	2	do	720
Maracaibo Electric Light Co.....	Maracaibo, Venezuela,	2	do	800
Maracaibo Water Works.....	do	1	do	50
Ayuntamiento Constitucional De				
Santo Domingo.....	Republica Dominica,	2	do	250

DISTILLING CONDENSERS

FOR ICE MACHINES ✱ ✱ ✱

				No.	Capacity tons in 24 hours.
Artificial Ice Co.....		New York City.		I	90
De La Vergne Refrig. Machine Co.		do		I	10
do	2d order,	do		I	90
do	3d do	do		2	24
do	4th do	do		I	30
do	5th do	do		I	30
do	6th do	do		I	30
do	7th do	do		I	90
do	8th do	do		I	12
do	9th do	do		I	5
do	10th do	do		I	60
do	11th do	do		2	180
do	12th do	do		I	10
do	13th do	do		I	60
do	14th do	do		I	30
do	15th do	do		I	90
do	16th do	do		I	25
do	17th do	do		I	10
do	18th do	do		I	20
do	19th do	do		I	50
do	20th do	do		I	30
do	21st do	do		I	90
do	22d do	do		I	12
do	23d do	do		I	15
do	24th do	do		I	50
do	25th do	do		I	5
do	26th do	do		I	10
do	27th do	do		I	30
do	28th do	do		I	5
do	29th do	do		I	20
do	30th do	do		I	5
do	31st do	do		I	12
do	32d do	do		I	12
do	33d do	do		I	10
do	34th do	do		2	120
do	35th do	do		I	35
do	36th do	do		I	10
do	37th do	do		I	20
do	38th do	do		I	90
do	39th do	do		I	15
do	40th do	do		I	60
do	41st do	do		I	15
do	42d do	do		I	20
do	43d do	do		I	20
do	44th do	do		I	10
do	45th do	do		I	10
do	46th do	do		I	15
do	47th do	do		I	25
do	48th do	do		I	30
do	49th do	do		I	10
do	50th do	do		I	90
do	51st do	do		I	40
do	52d do	do		I	60
do	53d do	do		I	25
do	54th do	do		I	30
do	55th do	do		I	35

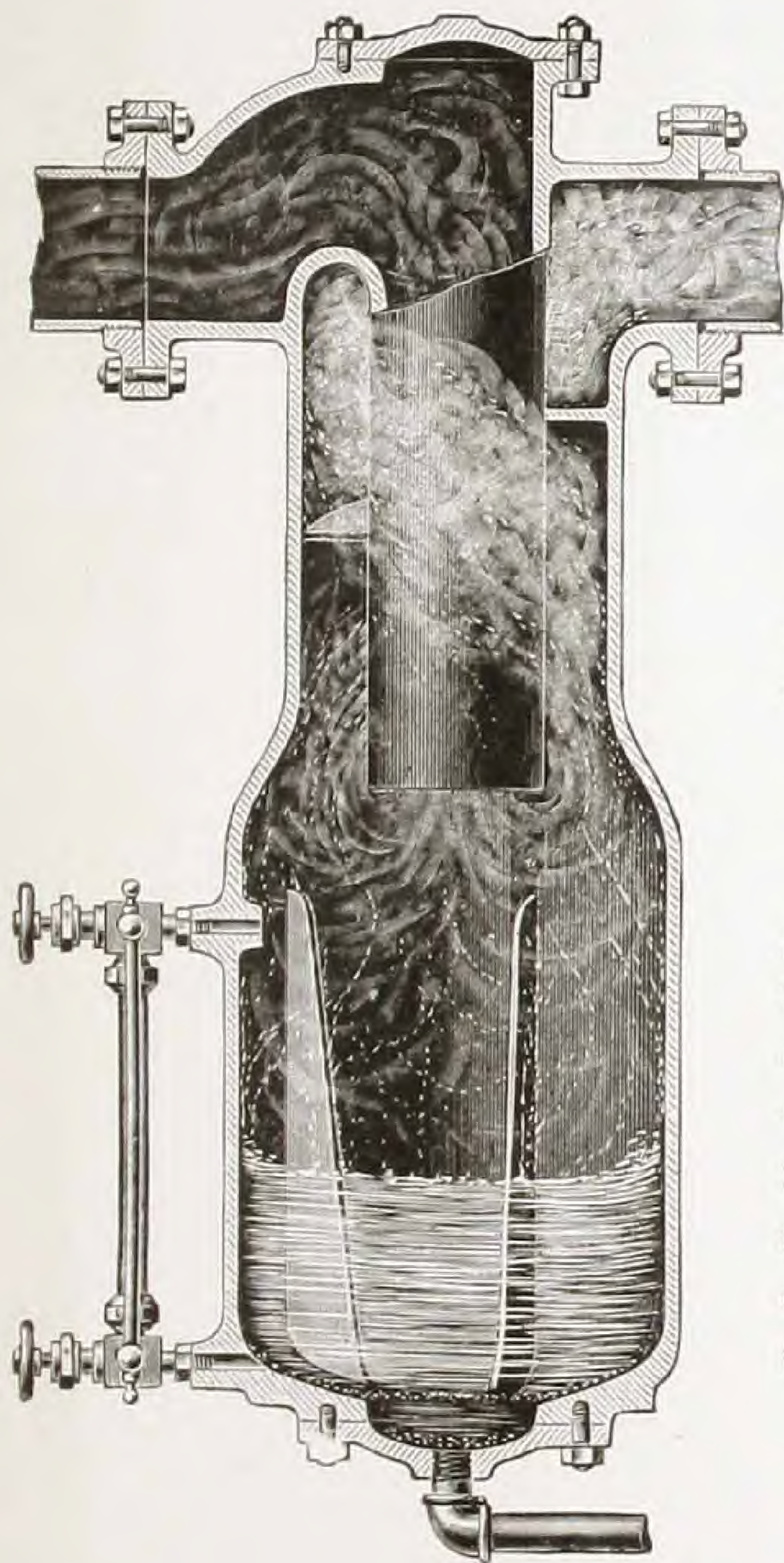
DISTILLING CONDENSERS—Continued.

			No.	Capacity tons in 24 hours.
De La Vergne Refrig. Machine Co.				
do	56th order,	New York City,	I	15
do	57th do	do	I	30
do	58th do	do	I	30
do	59th do	do	I	50
do	60th do	do	I	10
do	61st do	do	I	50
do	62d do	do	2	30
do	63d do	do	I	80
Macartney, McElroy & Co.....		do	I	10
New York Hygeia Ice Co.....		do	I	90
do		do	I	90
New York Steam Co.....		do	I	60
Jacob Ruppert.....		do	I	50
do	2d order,	do	2	90
do	3d do	do	I	90
do	4th do	do	I	90
Joseph S. Spinney.....		do	I	10
Traders' Hygiene Ice Co.....		do	I	60
Voss & Evans.....		do	I	120
Waldorf Hotel.....		do	I	5
do	2d order,	do	I	15
Alabama Brewing Co.....		Birmingham, Ala.,	I	35
do	2d order,	do	I	10
do	3d do	do	I	50
D. P. West.....		Montgomery, Ala.,	I	10
Consumers' Ice Co.....		Mobile, Ala.,	I	5
do	2d order,	do	I	12
Greenville Ice Co.....		Greenville, Ala.,	I	5
Independent Elec. Lt. & Pow. Co.		San Francisco, Cal.,	I	30
Chas. C. Moore & Co.....		do	I	10
do	2d order,	do	I	30
Pacific Power Co.....		do	I	155
George W. Stevens.....		do	I	10
The Hygeia Ice Co.....		New Haven, Conn.,	I	50
Wilmington Ice Co.....		Wilmington, Del.,	I	20
American Ice Co.....		Washington, D. C.,	I	120
Chr. Heinrich Brewing Co.....		do	I	60
do	2d order,	do	I	60
Interstate Cotton Oil Co.....		Augusta, Ga.,	I	30
Armour & Co.....		Chicago, Ill.	I	12
Fred. W. Wolf Co.....		do	I	30
Ainslie, Cochran & Co.....		Louisville, Ky.,	I	12
Graves County Water & Light Co.		Mayfield, Ky.,	I	12
The Peoples' Crystal Manufactory.		Paducah, Ky.,	I	20
New Orleans Brewing Association,				
Pelican Branch.....		New Orleans, La.,	I	20
McDonald & Hart.....		do	2	60
New Orleans Brewery.....		do	I	30
do	2d order,	do	I	5
C. F. Briggs & Co.....		North Adams, Mass.,	I	15
National Ice Machine Co.....		St. Louis, Mo.,	2	10
Pennsylvania Iron Works Co.....		Camden, N. J.,	I	15
West Jersey Ice Manufacturing Co.		do	I	35
do	2d order,	do	I	35
Pennsylvania Iron Works Co.....		New Brunswick, N. J.,	I	25
Trenton Hygeia Ice Mfg. Co.....		Trenton, N. J.,	I	120
People's Hygienic Ice Mfg. Co....		Brooklyn, N. Y.,	I	60
The Hygeia Refrigerating Co.....		Elmira, N. Y.,	I	25
do	2d order,	do	I	25

DISTILLING CONDENSERS—Continued.

		No.	Capacity tons in 24 hours.
Spring Lake Ice Co.....	Mamaroneck, N. Y.,	I	10
Murray & Rohe.....	Rockaw'y Bch., L. I., N. Y.	I	20
Queen's County Ice Mfg. Co.....	Far Rockaway, L. I., N. Y.	I	50
Frank Dick.....	Bucyrus, Ohio,	I	10
Becker Brewing Co.....	Cincinnati, Ohio,	I	10
Bellevue Brewing Co.....	do	I	20
Sheriff St. Market Cold Stor. Co..	Cleveland, Ohio,	I	30
do 2d order,	do	I	30
Koehnline Brothers.....	Steubenville, Ohio,	I	35
Du Bois Brewing Co.....	Du Bois, Pa.,	I	15
National Brewing Co.....	Jeanette, Pa.,	I	15
New York & Pennsylvania Co....	Johnsonburg, Pa.,	I	60
Goenner Brewing Co.....	Johnstown, Pa.,	I	20
Glen Willow Ice Mfg. Co.....	Manayunk, Pa.,	I	20
do 2d order,	do	I	60
do 3d do	do	I	60
Penna Iron Works Co.....	Philadelphia, Pa.,	I	20
do 2d order,	do	I	20
Phila. Cold Sto. & Warehouse Co..	do	I	90
Quaker City Cold Storage Co.....	do	I	30
Iron City Brewing Co.....	Pittsburgh, Pa.,	I	40
Lauer Brewing Co.....	Reading, Pa.,	I	30
Washington Ice & Storage Co....	Washington, Pa.,	I	20
York Manufacturing Co.....	York, Pa.,	I	35
Adam Scheidt Brewing Co.....	Norristown, Pa.,	I	30
Palmetto Brewing Co.....	Charleston, S. C.,	I	30
Palmetto Ice Co.....	Spartanburg, S. C.,	I	30
Scruggs & Ewing.....	Union City, Tenn.,	I	10
San Antonio Brewing Association.	San Antonio, Tex.,	I	90
Kingan & Co.....	Richmond, Va.,	I	10
Richmond Brewery.....	do	I	25
Lewis & Hazlett.....	Wheeling, W. Va.,	I	60
Louis Neibergall.....	do	I	10
Schmullbach Brewing Co.....	do	I	60
do 2d order,	do	I	60
N. J. & San Domingo Brewing Co.	San Domingo,	I	12
do 2d order,	do	I	12
W. Indian & Br. Guiana Ice Co., Ltd.	Demerara, Br. Guiana,	I	20

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